Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

October 19, 1932

Public Library
54 Court

Announcement

The decade just closing marked the period of greatest expansion in many industries, notably those in which nonmetallic-mineral producers are engaged. During those years businesses of all kinds became accustomed to a rapidly and continually increasing volume of trade and, growing fat and opulent on the large profits of the time, adopted an attitude of easy tolerance toward large expenditures and the giving of superfluous services. Money was easily made and just as easily spent, and there was little serious demand for economic justification as a test of fitness. In such an "easy-come-easy-go" period methods that would now be frowned upon as wasteful were readily accepted and were esteemed helpful and worth-while.

Business-paper publishing adjusted itself to the spirit and needs of the times. Some papers that had appeared monthly increased the frequency of their publication to biweekly and even weekly intervals, as the rapidly expanding industries they served moved forward both technologically and commercially. New developments followed one another in quick succession and the task of reporting them became one of considerable labor, demanding alertness, flexibility and a facile adaptability.

But business in general could not long support the form and scale of inflation that characterized all industries. Service had been added to service and superfluity to superfluity until, under the pressure of declining business, the work performed cost more than the resulting revenue could bear. Increasing work meant increasing cost and so the time came when there was a lull in expansion and a shrinkage of income, and when a closer scrutiny of expenditures placed a severe check on superfluities. As expansion decelerated, the duties of the reporter became less arduous, the need for rapid and frequent reporting and comment became less pressing.

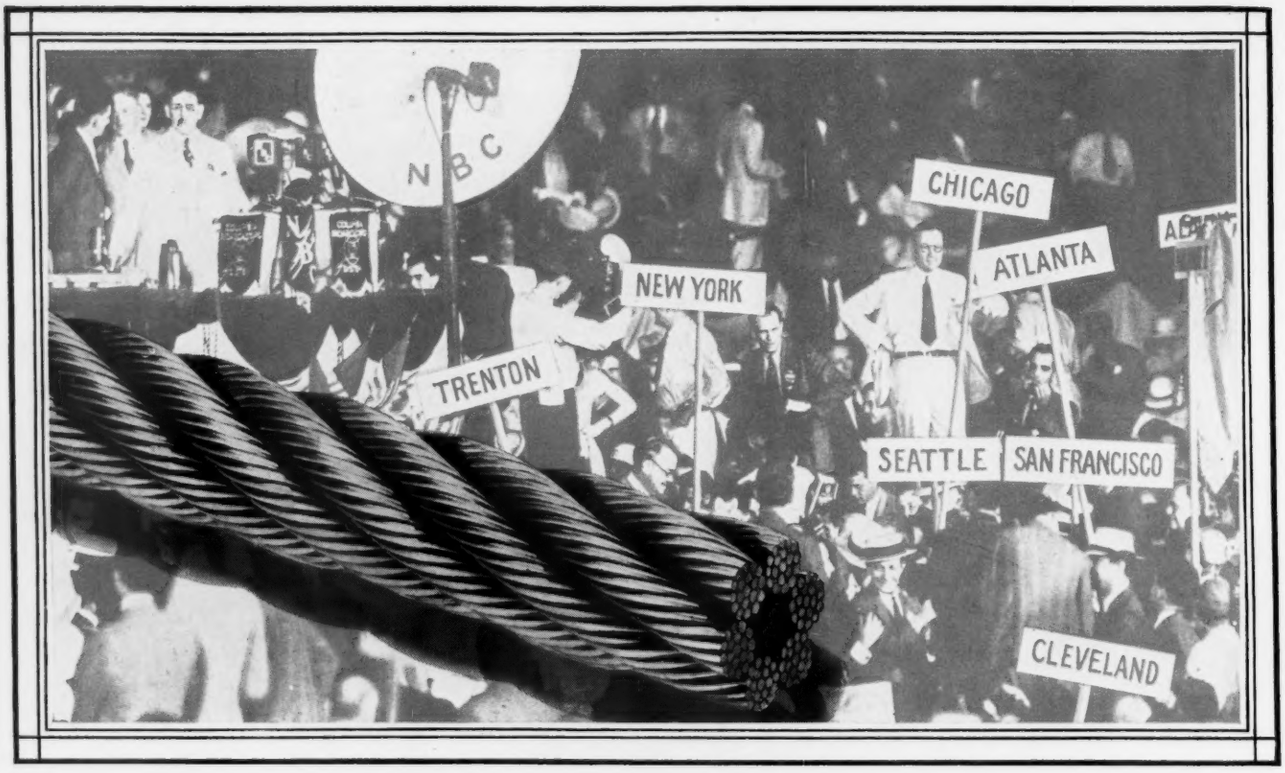
The necessity for readjustment became increasingly evident in all lines of trade, in publishing as well as in others. With the return of the conditions which characterized the temperate and healthy development that preceded the post-war inflation it has seemed wise to restore business-paper publishing to the basis of operation that was proved best in that period of business sanity. Accordingly, next month PIT AND QUARRY will return to its former plan of monthly publication, the first monthly issue to appear in November and succeeding issues on the first day of every month thereafter.

This resumption of the old plan is more than an adjustment to meet the requirements of a new era in business growth. It results in many practical advantages—not the least of which is reduced cost—which will be passed on to readers and advertisers. To the former these will take the form of a better paper, made up of better articles on a greater variety of subjects, which can be read and studied at greater leisure. Furthermore, the subscription rate will be cut in halves, the gains accruing also to old subscribers, whose subscriptions will be automatically extended on a *pro rata* basis. The gains to advertisers will be evident in greater reader interest, longer life for each advertisement, and in their ability to conduct uninterrupted campaigns of a higher standard of advertising.

PIT AND QUARRY is very glad to be able to announce a change which is so completely in accord with the spirit of the times and which creates such important advantages for both readers and advertisers.

THE PUBLISHER

Since September 11, 1929, the largest net paid A. B. C. circulation in the field



This PLATFORM
will appeal to any rope buyer

There are three planks in the Roebling Rope Platform—three simple, clean-cut statements of timely interest to every rope user.

1. Roebling believes that *safety* is the first requirement of practically every rope application. It is, therefore, the definite policy of this company to place safety to the forefront as an essential quality of Roebling Wire Rope and to make this rope unsurpassingly dependable.

2. Roebling advocates the purchase of rope on the basis of "lowest possible operating cost" consistent with this safety. It builds into its ropes the utmost of strength and stamina and confidently asserts that NO wire rope, regardless of make or construction, will show lower general-average operating cost.

3. It is Roebling's conviction that there is no wire rope cure-all—no one design of wire rope suitable for all purposes. Roebling makes wire rope of a great variety of types and designs, including Standard Right, Left, Lang, Preformed and Alternate Lays, in all degrees of rope and strand flexibility. Therefore, it is able to recommend, without prejudice, *exactly* the rope needed for each individual use.

JOHN A. ROEBLING'S SONS CO., TRENTON, N.J.

Wire • Wire Rope • Copper and Insulated Wires and Cables
Welding Wire • Flat Wire • Wire Cloth and Wire Netting

Branches in Principal Cities Export Dept.—New York, N.Y.

JOHN A. ROEBLING'S SONS COMPANY

Rochester Public Library
5 Court Street

This is what one Quarry Superintendent writes about N. Y. B. & P. Co. Products...

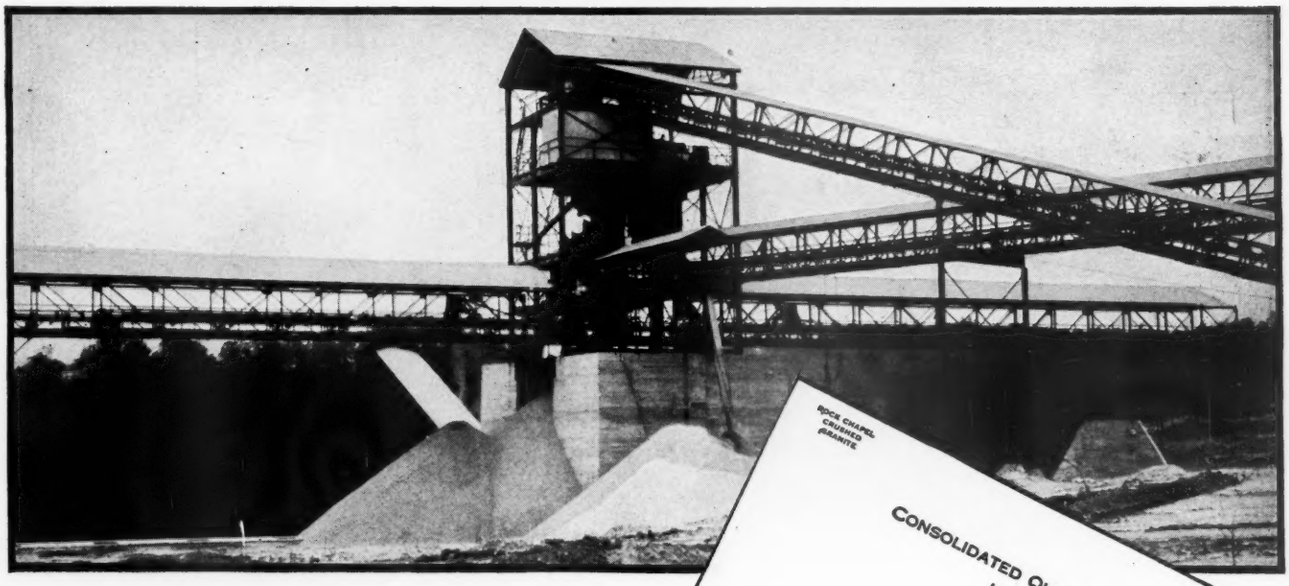
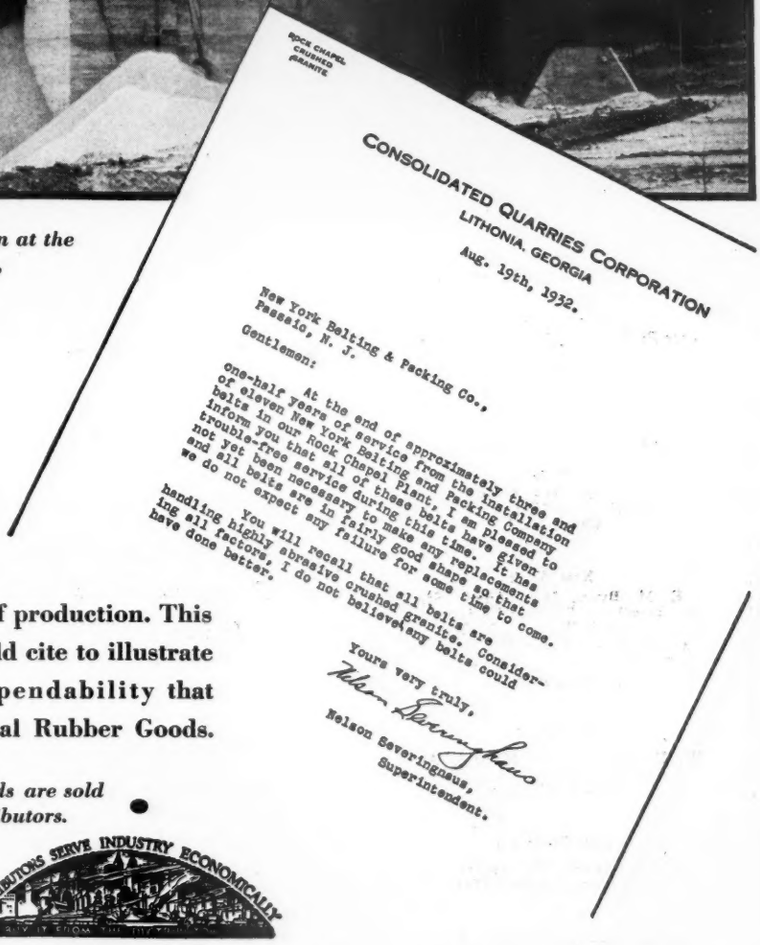


Illustration shows three giant conveyors in action at the Consolidated Quarries Corporation Plant, near Atlanta, Georgia.



ROCK CHAPEL CRUSHED GRANITE

CONSOLIDATED QUARRIES CORPORATION
LITHONIA, GEORGIA

Aug. 19th, 1932.

New York Belting & Packing Co.,
Passaic, N. J.

Gentlemen:

At the end of approximately three and one-half years of service from the installation of eleven New York Belting and Packing Company belts in our Rock Chapel plant, I am pleased to inform you that all of these belts have given trouble-free service during this time. It has not yet been necessary to make any replacements and all belts are in fairly good shape so that we do not expect any failure for some time to come.

You will recall that all belts are handling highly abrasive crushed granite. Considering all factors, I do not believe any belts could have done better.

Yours very truly,

Nelson Severinghaus

Nelson Severinghaus,
Superintendent.

...MR. NELSON SEVERINGHAUS Superintendent Consolidated Quarries Corporation writes in his letter, reproduced for your perusal, a better advertisement than we could possibly phrase. His conveyors are called upon to maintain a most rigid and exacting schedule of production. This is but one of many examples which we could cite to illustrate the economy, efficiency and certain dependability that characterize all N. Y. B. & P. Mechanical Rubber Goods.

• *N. Y. B. & P. Mechanical Rubber Goods are sold exclusively through competent distributors.* •

DISTRIBUTORS SERVE INDUSTRY ECONOMICALLY

NEW YORK BELTING & PACKING CO.

1790 BROADWAY — NEW YORK BELTING & PACKING CO. FOUNDED 1846 — NEW YORK CITY

Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 25 October 19, 1932 Number 2

MEMBER AUDIT BUREAU OF CIRCULATIONS

Published bi-weekly on Wednesday for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other non-metallic minerals. Entered as second-class matter October 9, 1928, at the Postoffice at Chicago, Ill., under the Act of March 3, 1879.

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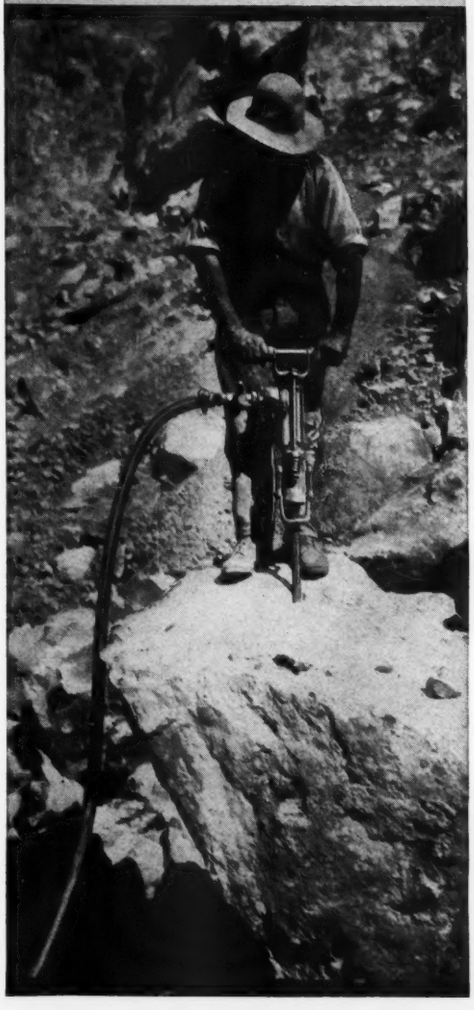
THIS HOSE CAN TAKE IT



The severest duty to which you can put any air hose is taken as part of the day's routine by Goodyear Emerald Cord Air Hose.

It withstands the pulsating pressure, withstands vibration, and stands up ruggedly under abrasion and wear.

Its central tube is specially compounded to resist the action of both warm and cold lubricating oils.

Its body of double-braided stoutest Goodyear Cord withstands pressures from within and without, and also resists vibration.

Its firm, tough cover is staunchly resistant to the abrasion encountered on sharp rock and rough surfaces.

Goodyear Emerald Cord Air Hose, Style M, and Wingfoot are specified to your particular service by the G.T.M.—Goodyear Technical Man. You will find you get more efficient hose, and also save considerable money in hose replacements, if you have the G.T.M. handle your hose requirements. To get in touch with him, write to Goodyear, Akron, Ohio, or Los Angeles, California, or call your nearest Goodyear Mechanical Rubber Goods Distributor.

All Goodyear products are constantly under development and test for further improvement. Each new advance is completely mill- or mine-proved when offered for industrial service.

THE GREATEST NAME IN RUBBER

GOODYEAR

BELTS • MOLDED GOODS • HOSE • PACKING

Classified Buyer's Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

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Universal Road Machinery Co.

Ash- and Refuse-Handling Equipment
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Haiss Mfg. Co., Geo.

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Simplicity System Co.

Babbitt Metal
Ryerson and Son, Inc., Joseph T.

Balls (Grinding)
Kennedy-Van Saun Mfg. and Eng. Corp.

Balls (Tube-Mill, etc.)
Kennedy-Van Saun Mfg. and Eng. Corp.

Belting
Goodyear Tire and Rubber Co., Inc.
Haiss Mfg. Co., Geo.
New York Belting and Packing Co.

Bins (Cast Iron)
Allen-Sherman-Hoff Co.

Bins (Steel)
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.

Bin Gates
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Haiss Mfg. Co., Inc., George
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Morrow Mfg. Co.
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Sauerman Bros., Inc.

Capstans (See Winches and Capstans)

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Car Wheels (See Wheels—Car)

Carriers
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McLanahan and Stone Corp.

Cement Pumps (See Pumps; Air Pumps)

Chain (Elevating and Conveying)
Haiss Mfg. Co., Geo.

Chutes and Chute Liners
Goodyear Tire and Rubber Co., Inc.
Haiss Mfg. Co., Geo.
McLanahan and Stone Corp.
Morrow Mfg. Co.
New York Belting and Packing Co.

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Clamshell Gates (See Gates-Clamshell)

Classifiers
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Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.

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Cones (Sand-Washing)
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Conveyors and Elevators
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Haiss Mfg. Co., George
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
McLanahan and Stone Corp.
Morrow Mfg. Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

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Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.

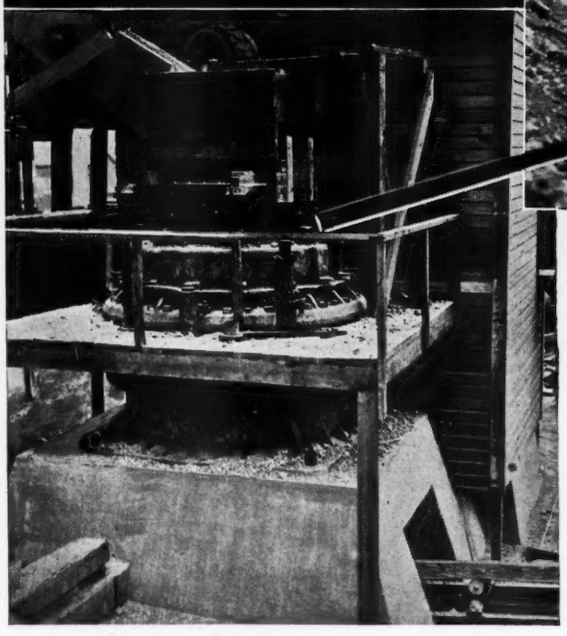
Crushers (Cone)
Nordberg Mfg. Co.

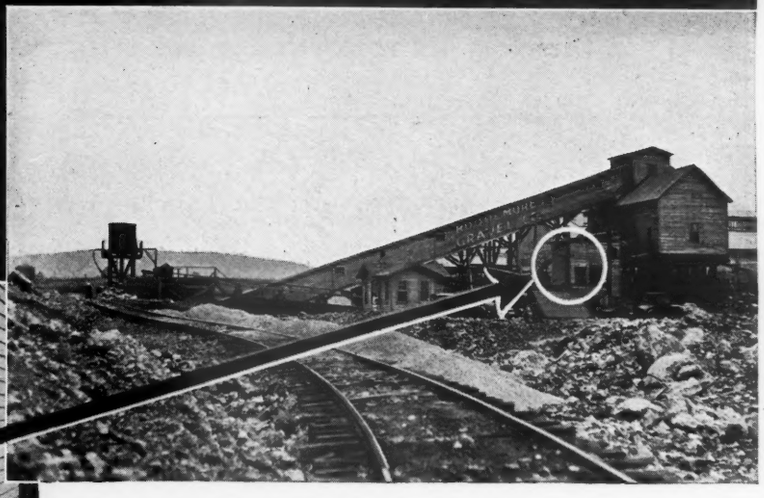
Crushers (Jaw and Gyratory)
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
Nordberg Mfg. Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Crushers (Roll)
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.

Crushing Rolls
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
Traylor Eng. & Mfg. Co.

When Confronted with the Problem of Securing ... *Big Capacity of Fine Product*





Birmingham, Alabama, slag plant of the Roquemore Gravel Company, where a 5½ foot Symons Cone Crusher is in service.

In 1930, the Roquemore Gravel Company installed a 4 foot Symons Cone Crusher in their Montgomery, Alabama, gravel plant. With the opening of a new slag plant in Birmingham in 1932, a 5½ foot machine was purchased as it was the only crusher that could produce in quantity the fine product desired.

This is just one more of the many users who has put in additional Symons Cones when the need arose for greater capacity in fine crushing. It is just one more evidence of the many satisfied users found among the largest producers of crushed materials, whether it be ore, gravel, rock or slag.

If you want a more uniform product and a lower crushing cost, install a Symons Cone.

Other Machinery Made by Nordberg Includes

Diesel and Steam Engines
Air and Gas Compressors
Mine Hoists

Underground Shovels and Track Maintenance Machinery

NORDBERG MFG. CO., MILWAUKEE WISCONSIN

NEW YORK
60 East 42nd St.

LONDON, ENG.
Bush House

LOS ANGELES
Subway Terminal Bldg.

SYMONS CONE CRUSHERS

Classified Buyer's Guide

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Sprague and Henwood, Inc.

Drills (Blast-Hole)
Loomis Machine Co.

Drills, Diamond
Pennsylvania Drilling Co.
Sprague and Henwood, Inc.

Drills (Well) (See Drills—Blast-Hole)

Dryers
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdry. & Mach. Co.
McLanahan and Stone Corp.
Traylor Eng. & Mfg. Co.

Dust-Collecting Systems
Allen-Sherman-Hoff Co.

Dust Handling Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

Dust Hoods and Helmets
Pulmosan Safety Equipment Corp.

Dynamite (See Explosives)

Elevator Belting (See Belting)

Elevators (See Conveyors and Elevators)

Engineers
Allen Cone and Machy. Corp.
Kennedy-Van Saun Mfg. and Eng. Corp.

Engines (Diesel)
Nordberg Mfg. Co.

Engines (Internal-Combustion)
Nordberg Mfg. Co.

Engines (Steam)
Nordberg Mfg. Co.

Excavating Machinery (See Shovels; Cranes; Buckets, etc.)

Excavators, Shallow Grading (Bucket Elevator Type)
Haiss Mfg. Co., Geo.

Fans (Exhaust)
Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
Kennedy-Van Saun Mfg. and Eng. Corp.
Morrow Mfg. Co.
Smith Engineering Works

Floor Sweeping Systems (Hydro Vacuum)
Allen-Sherman-Hoff Co.

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Ensign-Bickford Co.

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Goodyear Tire and Rubber Co., Inc.
New York Belting and Packing Co.

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Traylor Eng. & Mfg. Co.

Guards (Wire)
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Hoists
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Idlers
Smith Engineering Works

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Edelblute Co., T. H.

Kilns and Coolers (Rotary)
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Traylor Eng. & Mfg. Co.

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Kennedy-Van Saun Mfg. and Eng. Corp.

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New York Belting and Packing Co.

Mills (Grinding) (See also Crushers—Hammer)
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Traylor Eng. & Mfg. Co.

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Ore Separators
Allen Cone and Machy. Corp.

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Packing
Goodyear Tire and Rubber Co., Inc.
New York Belting and Packing Co.

Partitions (Wire)
National Wire Cloth Co.

Perforated Metals
Chicago Perforating Co.
Morrow Mfg. Co.

Here's Good News—

Pit and Quarry becomes a monthly publication starting in November. Readers will now get—

1. An increase in the quality of Pit and Quarry, and an increase in the quantity of editorial matter in each issue.

2. A greater convenience—readers will now have more time to read and study each issue, and to digest the many ideas and suggestions contained therein.

3. A 50% reduction in the subscription price—now instead of paying $2.00 per year, a single dollar will cover this period's subscription. The three year subscription price has now been reduced to $2.00.

Take advantage now of these new rates—start your subscription with the big November issue. If already a subscriber pass the blank below to someone else who would profit by reading Pit and Quarry, regularly.

Return This Coupon Today—Start Your Subscription with the November Issue

PIT AND QUARRY,
538 So. Clark Street,
Chicago, Illinois.

Enclosed find remittance for which enter my subscription to Pit and Quarry for ..... 1 year ($1.00) ..... 3 years ($2.00) starting with the November issue. (Foreign add $1.00 per year.)

My Name..... Title.....

Company Name.....

Send to (Address).....

We Produce.....

Classified Buyer's Guide

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Universal Road Machinery Co.

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Kennedy-Van Saun Mfg. and Eng. Corp.
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Allen-Sherman-Hoff Co.

Pumps (Centrifugal)
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Allen-Sherman-Hoff Co.

Pumps (Dredging)
Allen-Sherman-Hoff Co.

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Ryerson and Son Inc., Joseph T.

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McLanahan and Stone Corp.
Smith Engineering Works

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Allen Cone and Machy. Corp.
Smith Engineering Works

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Cleveland Wire Cloth & Mfg. Co.
Deister Concentrator Co.
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Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
McLanahan and Stone Corp.
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National Wire Cloth Co.
Roebling's Sons Co., John A.
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Universal Road Machinery Co.

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Allen Cone and Machy. Corp.
Deister Concentrator Co.
Deister Machine Co.
Gay, Rubert M.
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Lewistown Foundry & Machinery Co.
McLanahan and Stone Corp.
Universal Road Machinery Co.

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Nordberg Mfg. Co.

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Vibrating Screen Plate
Chicago Perforating Co.
Morrow Mfg. Co.

Vibrating Screens (See Screens—Vibrating)

Washers (Sand, Gravel, and Stone)
Allen Cone and Machy. Corp.
Haiss Mfg. Co., George
Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
McLanahan and Stone Corp.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Welding Supplies
Roebling's Sons Co., John A.

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Wire Cloth
Cleveland Wire Cloth & Mfg. Co.
National Wire Cloth Co.
Roebling's Sons Co., John A.

Wire Rope
Roebling's Sons Co., John A.
Williamsport Wire Rope Co.

Wire-Rope Fittings
Roebling's Sons Co., John A.
Williamsport Wire Rope Co.

Wire-Rope Slings
Roebling's Sons Co., John A.
Williamsport Wire Rope Co.

Wire (Welding)
Roebling's Sons Co., John A.

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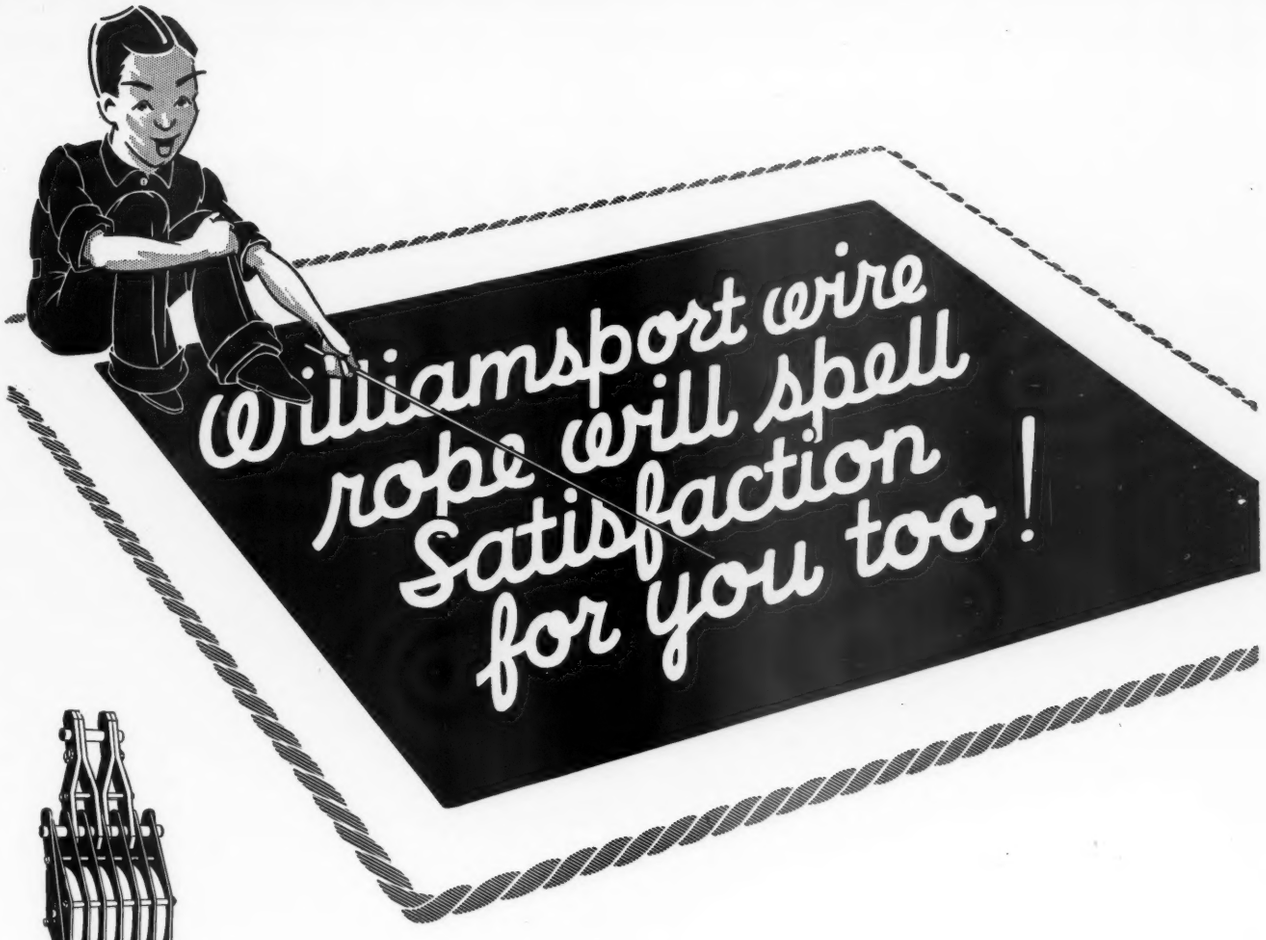
Roebling's Sons Co., John A.

Worm Gears (See Gears and Pinions)



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PROOF — Maintenance Cut to a Fraction

Hydroseal Impeller after pumping 160,000 tons of finished gravel (the equivalent of 300,000 tons of material, half of which is waste) in 680 hours service. Inside of shroud gouged out by material but **No Wear** on outside of shroud.

VOLUME 25 NUMBER 2

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, OCTOBER 19, 1932

Stone Men Agree to Maintain Employment

HELD ESSENTIAL TO RECOVERY

The New York State Crushed Stone Assn. held its first fall meeting on Wednesday, Sept. 21, at the Mohawk Country Club, Schenectady, N. Y. J. E. Cushing, president of the Cushing Stone Co. of that city, was host and L. M. Heimlich, president of the association, presided. About 30 members attended the meeting, many of them playing golf in the morning before the regular session began. Luncheon was served at the clubhouse.

The meeting was called to order by Mr. Heimlich, after which the regular business of the association was postponed to allow reports to be made by the representatives of the New York State Construction Council of the progress made by this organization to date and to outline future plans.

Harold V. Owens first gave a brief outline of the purpose of the council, of which he is executive-committee chairman. Thomas E. Wright, executive secretary, then told what had been accomplished by the council and what was planned for the future. Following this report, G. J. Ward, publicity director of the council, outlined the publicity campaign that had been prepared. The financial status of the council and the raising of funds to carry on its work were also discussed. All members of the association present agreed that the work of the council was of great importance to them and that they would support it to the best of their ability.

As most of the meeting was taken up by the discussion of the affairs of the council little time remained for the affairs of the association and it was decided to call another meeting in October. The members present were unanimous in their opinion that strenuous efforts must be continued to provide employment for their present employees and pledged themselves to do their utmost toward keeping them at work.

The New York State Construction Council is composed of individuals and organizations interested in fair and reasonable taxation and sensible and economical public-works policies. One of its aims is the promotion of a public-works policy planned far enough ahead to eliminate the present costly method of planning from year to year. Another aim is to prevent the diversion of gasoline- and vehicle-tax funds to uses other than those for which they were originally intended.

The executive committee of the New York State Construction Council is composed of Harold V. Owens, chairman, Utica; William L. Sporborg, treasurer, Syracuse; Thomas E. Wright, executive secretary, Rochester; William L. Collins, Hornell; Eugene Forrestel, Akron.

The directors are: Adam Beck, Buffalo; W. L. Collins, Hornell; H. N. Snyder, Buffalo; E. L. Heidenreich, Jr., Newburgh; W. L. Sporborg, Syracuse; Thomas J. Dunn, Glens Falls; E. P. Forrestel, Akron; J. L. Heimlich, LeRoy; G. W. Chambers, Rochester; F. J. Collins, Rochester; Henry Brewster, Syracuse; H. V. Owens, Utica; A. V. Manley, Binghamton; J. H. Bolton, Watkins Glen; J. E. Cushing, Schenectady; L. P. Butts, Oneonta; Richard Hopkins, Albany; J. E. Conway, Kingston; L. N. Whitcraft, New York City; A. F. McConville, Ogdensburg; J. W. Slawson, White Plains; S. A. Scullen, Cohoes.

$50,000 Plant Replaces Hersey Fire Wreckage

★ The Hersey Gravel Co., Hersey, Mich., is progressing rapidly with the construction of a new $50,000 gravel plant to replace the plant which burned down last summer. The plant was designed by the F. M. Welch Eng. Service, which also is furnishing most of the equipment.

★★★★★★★★★★★★★★★★★★★★★★★★★

★ Meeting Competition by *Beating It!*

Items in this news section marked with a star call attention to those alert producers who are awake to the arrival of an era of good business and who are expressing their faith in the future by buying and installing their needed equipment NOW.

★★★★★★★★★★★★★★★★★★★★★★★★★

Explains Working of Sales Tax in Canada

OF INTEREST TO PRODUCERS

While the proposal for a general sales tax failed to pass at the recent session of Congress, it is believed by many that the subject will again be brought up at the December session, with a good chance for its adoption. With this in mind, V. P. Ahearn, secretary of the National Sand & Gravel Assn. and the National Ready Mixed Concrete Assn., asked G. G. Robinson, general manager of the Consolidated Sand & Gravel Co., Toronto, to explain how Canada's sales tax operates with reference to producers in these industries.

According to Mr. Robinson, in his reply to Mr. Ahearn, the Canadian sales tax has been in effect since 1920, the tax varying from 1 to 6 per cent. in different years. For 1932, the tax is 6 per cent. Until 1928, all sand and gravel produced and sold was taxable. In that year, an amendment to the law exempted all material sold without crushing, it being considered a natural product and, therefore, tax-free. The provision still stands, all sales of gravel, any portion of which is crushed, being taxable except where it is certified that the material is used in the manufacture of some product which in itself is taxable when sold.

By a special ruling, ready-mixed-concrete producers are not classed as manufacturers and their product is not taxed directly. They do pay a tax on all crushed gravel, crushed stone and cement used in their operations, however. Concrete products, on the other hand, are subject to tax as such and the maker, therefore, can buy his cement and crushed aggregates tax-free.

New Gravel Plant for Highway Construction

★ The Robbins, Young Co. of Minneapolis, Minn., is operating a new semi-portable gravel plant at Correctionville, Ia., to furnish aggregates for 8 mi. of concrete highway. The plant is being operated two shifts a day.

Martinsburg Quarry Wins Safety Trophy

NO ACCIDENTS IN 115,403 HOURS

Amid strong competition from other members of the National Crushed Stone Assn., the Martinsburg, W. Va., quarries 5 and 6 of the North American Cement Corp. won the *Explosives Engineer* award for its 1931 safety record, it is announced by J. R. Boyd, secretary of the association.

Sixteen of the many member quarries taking part in the contest worked the entire year without a lost-time accident. The Martinsburg quarry wins the bronze plaque, presented annually by *The Explosives Engineer*, by operating 115,403 man-hr. without a lost-time accident.

The other fifteen quarries, all of which received honorable mention, worked fewer man-hours. All companies receiving honorable mention are awarded parchment reproductions of the plaque.

The results of the annual contest are determined by the U. S. Bureau of Mines, in that all members of this safety movement must be enrolled in the National Safety Competition, which is conducted by the bureau for the famous "Sentinels of Safety" trophies. The leaders in the 1931 contest were as follows:

WINNER

Martinsburg Nos. 5 and 6 limestone quarries, Martinsburg, W. Va., operated by the North American Cement Corp., worked 115,403 man-hr. in 1931 without a lost-time accident.

HONORABLE MENTION

(All operated without a lost-time accident.)

Rock Hill trap-rock quarry, Quakertown, Pa., operated by the General Crushed Stone Co., worked 112,819 man-hr. in 1931.

Hillsville crushed-limestone quarry, Hillsville, Pa., operated by the Union Limestone Co., worked 99,622 man-hr. in 1931.

Columbia No. 3 limestone mine, Valmeyer, Ill., operated by the Columbia Quarry Co., worked 97,788 man-hr. in 1931.

Birdsboro crushed-stone quarry, Birdsboro, Pa., operated by the John T. Dyer Quarry Co., worked 91,209 man-hr. in 1931.

Akron limestone quarry, Akron, N. Y., operated by the General Crushed Stone Co., worked 89,764 man-hr. in 1931.

Rock-Cut limestone quarry, Syracuse, N. Y., operated by the General Crushed Stone Co., worked 84,004 man-hr. in 1931.

Security limestone quarry, Security, Md., operated by the North American Cement Corp., worked 80,011 man-hr. in 1931.

Middlefield trap-rock quarry, Wallingford, Conn., operated by the Connecticut Quarries Co., Inc., worked 78,123 man-hr. in 1931.

Knippa No. 4 trap-rock quarry, Knippa, Tex., operated by the Southwest Stone Co., worked 67,816 man-hr. in 1931.

Gasport dolomite quarry, Gasport, N. Y., operated by the Wickwire Spencer Steel Co., worked 63,340 man-hr. in 1931.

Speed Mill cement quarry, Speed, Ind., operated by the Louisville Cement Corp., worked 57,366 man-hr. in 1931.

Hendler's quartzite quarry, Wilkes-Barre, Pa., operated by the General Crushed Stone Co., worked 45,045 man-hr. in 1931.

Duluth trap-rock quarry, Duluth, Minn., operated by the Duluth Crushed Stone Co., worked 42,078 man-hr. in 1931.

Rocky Hill trap-rock quarry, Rocky Hill, Conn., operated by the Connecticut Quarries Co., Inc., worked 33,521 man-hr. in 1931.

Mt. Carmel trap-rock quarry, Mt. Carmel, Conn., operated by the Connecticut Quarries Co., Inc., worked 17,224 man-hr. in 1931.

E. T. Slider, of New Albany, Ind., recently secured a permit to construct a loading platform at Delmar and Water Sts., Covington, Ky.

Large Tunnel Blast in Pennsylvania Quarry

The General Crushed Stone Co. recently set off at its White Haven, Pa., quarry a blast which made available about 70,000 tons of stone. This was a tunnel shot with the main tunnel 3 ft. by 4 ft. and 45 ft. deep and with laterals averaging 72 ft. in length. More than 20,000 lb. of dynamite was used. The plant has been operating steadily all year and has a number of contracts yet to be filled. More than 200 persons witnessed the shot, including state, city, county, and railroad officials.

Iowa Producer Makes Improvements to Plant

★ L. G. Everist, Inc., one of the largest producers of sand and gravel and crushed stone in the northwest, has completed extensive improvements to its gravel plant at Hawarden, Ia. These improvements included the installation of a disintegrator and four Stephens-Adamson screw-washers and were made to remove shale which occurs in the deposit.

Buys New Equipment for Better Silica Cleansing

★ The Michigan Silica Co., Rockwood, Mich., has installed a 6-ft. by 48-ft. Hardinge scrubber for removing mica and other foreign materials from its product.

News Briefs

About 150 men are back at work at the plant of the Big Rock Stone & Material Co., near Little Rock, Ark., as the result of a large order for stone from the government for Mississippi River rip-rap and revetment work. Other orders have also been received and more are in prospect. According to J. C. Eakin, secretary of the company, operations will be carried on at full capacity all winter.

* * *

The Auxvasse Quarry Co. resumed operations at its plant near Auxvasse, Mo., recently to supply stone for highway work. Operations are expected to continue for several months on the present contract, using two shifts daily.

* * *

The Pacific Coast Aggregates Co. recently put its Niles, Cal., gravel plant back into operation in order to supply aggregates for highway construction in the vicinity. Approximately 21 men were put to work and 30 trucks are used to haul the material.

* * *

The Erie Stone Co. plant at Bluffton, Ind., is operating night and day to supply stone for highway contracts. Seventy trucks are being used to haul this material to the jobs.

* * *

The Grand Rapids Gravel Co. plant at Hersey, Mich., is operating 24 hr. a day to fill state-road contracts. As a result every able-bodied man in the town has a job, there is not a vacant house, and some families are even living in tents until other accommodations can be found.

* * *

The Arlington Lime & Stone Co., Erin, Tenn., is operating day and night to fill a state contract for highway construction.

* * *

The Marcem Quarries, near Gate City, Tenn., have resumed operations after having been closed down for several months. According to C. W. Kels, manager, 30 men are now employed.

* * *

The Ward Sand & Gravel Co., Oxford, Mich., recently put its sand-and-gravel plant into operation after having been shut down for almost a year. Orders have been pouring in steadily and justified resumption of operations at this plant, which is one of the largest in the state.

* * *

The Lord & Bishop gravel plant at Oroville, Cal., is shipping 50,000 tons of rock and gravel to Colusa for the construction of a weir on the riverfront there. It is expected that it will take three months to fill this order.

U. S. Gypsum Feeling Effect of Trade Gain

DROP IN PROFITS HALTED

Operations of United States Gypsum Co. are no longer on the downward trend which has characterized the past two years. At present the company's operations and profits appear to be moving horizontally. There has been some improvement in light construction in the past two months and a further pick-up is anticipated this fall. On the basis of the second half showing to date profits for this period should equal those of the first half and if further anticipated improvement materializes, the second half profits might well show an increase over the first half.

On the basis of earnings already realized, indications are net profit for the full current year will approximate $1,900,000 equivalent, after providing for preferred dividends, to around $1.15 a share on the 1,218,349 common shares outstanding on June 30. In the first six months of this year net amounted to $963,789 or 57 c. a common share against $2,241,560 or $1.62 a share on 1,216,956 shares in the first half of 1931. For the full year 1931 the company's net was $3,563,143 or $2.43 a share on 1,217,472 common shares.

On the basis of the indicated profit showing for 1932, it will be necessary for the company to dip into surplus to the extent of around $500,000 for common dividends which have been continued at the regular rate of 40 c. quarterly. However, with earned surplus of about $21,000,000 and with cash and government securities of nearly $12,000,000, it can easily make this distribution.

The company is operating now at about 17 per cent. of capacity. During the summer its operations were around 15 per cent. which was the low point for the present slump.

On September 1 the company added three new products to its wall board line. One of these, which has met with very good demand considering the short time it has been on the market, embodies a new principle of insulation. It is the regular sheet rock wall board one side of which is covered with aluminum foil. The other two items are a wood veneered sheet rock and a grain board which is a likeness of wood lithographed on the paper covering of wall board.

Pennsylvania Producer Builds Crushing Plant

★ The Warner Co. recently put into operation a new crushed-material plant alongside its gravel plant near Tullytown, Pa. This plant is so designed that it can produce crushed gravel made up of any desired percentage of various sizes. Crushed material is diverted from the main plant and sized over Kennedy-Van Saun triple- and double-deck vibrating screens. The five sizes produced are stored separately and are mixed for loading on a shuttle belt-conveyor under the bins.

New Michigan Gravel Plant in Production

★ I. L. Whitehead, Sault Ste. Marie, Mich., has put into operation a new 120-ton per hr. capacity plant for the production of commercial aggregates.

Erect Gravel Plant on Prince Edward Island

★ A tract of 150 acres of land near Conway, Prince Edward Island, has been bought by the Warren Bituminous Paving Co., according to the industrial department of the Canadian National Railways. The company will erect a gravel-crushing and screening plant on the property at a cost of $50,000.

California Plant Opens Rock-Asphalt Quarry

The Calrock Asphalt Co. is opening a new quarry about a mile from its plant near Davenport, Cal., according to R. A. Harker, chemist and plant superintendent. A new road is being built to this quarry to facilitate movement of the trucks which haul the material to the plant.

Arkansas Cement Plant Orders a New Cooler

★ The Arkansas Portland Cement Co., Okay, Ark., recently ordered an Allis-Chalmers reciprocating-grate clinker cooler for its 11-ft. 6-in. by 300-ft. rotary kiln. This cooler is of a new type differing from any other grate-type coolers on the market. The cooler ordered has a normal capacity of 140 bbl. per hr. with excess capacity if required. A cooler of so large a size was necessary as this kiln produces 3,200 bbl. of clinker per day. This installation is expected to be in operation early next year.

Highway-Stone Order Requires New Crusher

★ The Erin Lime & Stone Co., Erin, Tenn., recently received a large order for crushed stone from the state Highway department. As a result some new crushing equipment was installed and the plant put into operation after an extended shut-down. About 50 men are now employed and operations are being carried on night and day.

Let Second Hoover-Dam Cement Contract

FOUR COMPANIES SHARE AWARD

Contracts valued at $900,000 and comprising 332,500 bbl. of cement were awarded on Oct. 4 to four southern California cement companies by the Bureau of Reclamation of the Department of the Interior. The entire contract called for 400,000 bbl. which, with transportation costs, will cost over $1,000,000. The four companies participating in this order are: The Riverside Cement Co., Monolith Portland Cement Co., Southwestern Portland Cement Co., and the California Portland Cement Co. Some smaller Utah mills received the remainder of the order which was for 67,500 bbl.

This cement is to be used for preliminary work in the construction of the Hoover Dam and is the second contract to be awarded for this project. The first contract, last spring, was for material to be used for lining the diversion tunnels for the dam.

Completes New Plant for Road-Stone Job

★ The Amsterdam Stone Crushing plant on the Whitehall-Fair Haven road near Glens Falls, N. Y., has recently been completed and is now busy turning out stone for a highway-paving contract. About 20 men are now employed on a single shift but later three shifts a day will be worked. The plant was erected primarily to furnish stone for this contract, but the company intends to run the plant as a permanent commercial operation after this contract is completed. Charles Holmberg is in charge of operations.

Limestone Pulverizers May Build Bigger Plant

★ Earl and Asa Charbonneau recently installed a pulverizer and started to grind limestone on their farm west of Burlington, Ia. The deposit has a high calcium content, making it suitable for agricultural limestone. Later the brothers hope to build a larger plant on the property and branch out into other products.

★ The Essex Trap Rock Co. of Peabody, Mass., has plans in progress for replacing its crushing equipment. Approximately $15,000 will be spent in new equipment and other improvements.

★ A granite plant to cost in the neighborhood of $40,000 is to be built shortly by the Elberton Granite Co. of Elberton, Ga.

Editorials

Price, Profits and Production

ALTHOUGH there has been marked improvement in the price situation in all branches of the nonmetallic-mineral industries, the lessons of the production-at-any-price fallacy have not yet found their way into the understanding of many producers. Too many men still have their eyes focused on the volume of output instead of on the volume of profit, with the result that they are late in feeling the betterment in business conditions that has already been experienced by wiser operators.

It required many months of hard losing to convince most business men that there are no adequately compensating advantages for doing business at a loss. In all this there was, of course, in some cases an element of stubbornness, but on the whole we can not doubt that in many cases it was the genuine conviction of business men that it is better to do a big business at little or even no profit than to do a small business at a small profit. Apparently some have even believed that it is better to do a big business at a loss than to do a small business at at loss, even though the big business' losses are greater than those of the small business. To such men bigness has become a fetish which, under recent conditions, has always proved to be an expensive one and often a disastrous one.

Evidence of the more sensible attitude toward the relationship between prices, production and profits is provided by Edmond S. La Rose, assistant comptroller of the Bausch & Lomb Optical Co., quoted by Herbert Kerkow in a recent issue of *Sales Management*. In his opinion, it is better to suffer a loss of from 10 to 20 per cent. in sales volume than to reduce costs to profitless levels, for companies that do this will either have a better profit position or escape bankruptcy. "This may sound like a radical statement for these days, when prices are still tumbling all about us." He was speaking before the late recovery in prices. "Nevertheless, it would no doubt be found true if companies would only study their manufacturing and, particularly, their functional selling costs," he said.

He points out (what should be elemental and obvious to any business man) the great increases in volume that are necessary to offset reductions in prices and the fact that these volume increases grow more rapidly than the price concessions. Thus, if prices are lowered only 10 per cent., the sales volume must be raised more than 11 per cent. to maintain the same volume of profit. If they are reduced 20 per cent., volume must rise 25 per cent., and if they decline 25 per cent., volume must go up 33⅓ per cent. No one needs to be told that, although prices have fallen even more than these hypothetical percentages assume, volume has not shown nearly the increases demanded; hence, the frightful decline in profits which nearly every producer has experienced.

The remedy lies in better, more intelligent selling rather than in price-cutting. It is obvious, says Mr. La Rose, that if buyers do not respond to price reductions, common sense dictates a return to the quality appeal, or to style and design promotion where these are factors. New selling ideas should be developed, the quality of the product should be improved, and other means should be adopted to quicken the buyer's desire for the commodity.

Those producers who have recently stiffened their prices are probably discovering that, while they may not increase their volume materially or at all, they are at least reducing losses, and certainly there is no surer way of working back to profitable production. As this truth becomes more evident and as competitors find that one or the other of them has made the discovery and is profiting by it, we may confidently expect a return to sanity in pricing and a corresponding improvement in the profit position of competing businesses. It was apparently necessary that some producers should be brought to the verge of bankruptcy before the inevitable outcome of their price policies could be made clear to them. The recent improvement in prices is evidence of the fact that this truth is more widely understood than at any former time during the last few years.

One example of this newer attitude toward pricing comes to us from Indiana, where one sand-and-gravel producer has not "sold a pebble unless there was a profit in it." The company has had no state or county work, due to unfavorable politics, yet it has earned 12½ per cent. net profit on its investment this year. This is certainly pertinent evidence of the soundness of the "no-profit-no-sale" policy.

Truth in Advertising

AT the recent convention of the Financial Advertisers' Association in Chicago much emphasis was laid upon the need for truth in advertising. The amount of discussion given the subject was uncommon, not alone when compared with the records of previous conventions but also when considered in connection with the need for a new attitude toward advertising in a field where abuses have multiplied rapidly. The failure of most advertising of whatever kind to hasten the return of good business, combined with the naturally increasing tendency to try to make advertising turn the trick by whatever means could be found, has made a new appraisal of advertising imperative.

In the field of machinery selling advertising has been conducted on a higher plane, we believe, than in many other industries. The manufacturer who

offers his product on the basis of demonstrable merit is on sound ground, for, having the evidence with which to convince a skeptical prospective buyer and appealing to one who has the means for checking that evidence and, so, of verifying or disqualifying it, he is not so easily tempted to indulge in the kind of overstatement and false claims that are the stock-in-trade of the average copy writer. The buyer and seller of machinery deal in tangible quantities and qualities; it is possible for the buyer to make a material and actual appraisal of performance and so check the claims made by the seller before the investment involved has been destroyed or greatly impaired. There is, therefore, less of the temptation—ever present with the advertiser who deals with the intangibles of style, beauty, and the like—to resort to fraud or even to mild misrepresentation in his effort to interest buyers in his product.

The advertising of equipment makers in our field is largely of this fact-presenting type and it is remarkably free from the kind of slippery half-statements which characterize so much of the advertising of goods of general consumption. Producers, therefore, have learned to rely with good reason on the temperateness of the claims made by advertisers who seek their interest, knowing from experience that no reliable manufacturer lays claim to any qualities which he can not demonstrate to the buyer's satisfaction. It is largely for this reason that many sales result directly from the sound type of advertising done by manufacturers who supply our and like industries. Within recent months we have been told by advertisers of instances in which producers have ordered equipment direct from the advertised descriptions of it and, in one case, without even asking for prices. These cases indicate a degree of confidence that is the result of advertisers having adopted the wise and honest course of depending on truth in their advertising and of refraining from any form of statement that might misinform and mislead.

Tax Diversion Goes On

THE diversion of gasoline-tax funds to purposes other than road-building continues. The Illinois legislature has just passed and sent to the governor for signature Senate Bills 29 and 30, which provide that counties may use their share of the state gasoline tax for immediate relief of the unemployed. Cook County's share alone amounts to $2,000,000, of which, however, much has already been obligated on contracts now in force. By the adoption of suitable resolutions by their boards of supervisors the counties can get the money from the state.

Strange as it may seem, there was no spirited fight against these measures, although there was, of course, some opposition based on a desire to keep the road fund intact. However, the absence of intelligently organized opposition of the kind that prevented similar diversions in Mississippi last April and in Pennsylvania in August is indicative of the efforts which must be put forth if diversions in other states are to be avoided. The work of the Pennsylvania Construction Council, which was so successful in the Keystone state, points to the need for similarly organized campaigns in other states. Only in such a way can similarly effective results be expected.

If gasoline-tax diversion continues, the users of our highways may resort to some drastic measures to stop a procedure which, besides being illegal (except where provided for by legislation), is also unjust to highway transport. The means for correction of this abuse lies with the operators of motor-vehicles, but they must be supported and helped by all those who are in any way interested in the promotion of highway transportation. Those favoring diversion are well organized and their efforts can not be successfully combated unless the opposition arms itself for a struggle.

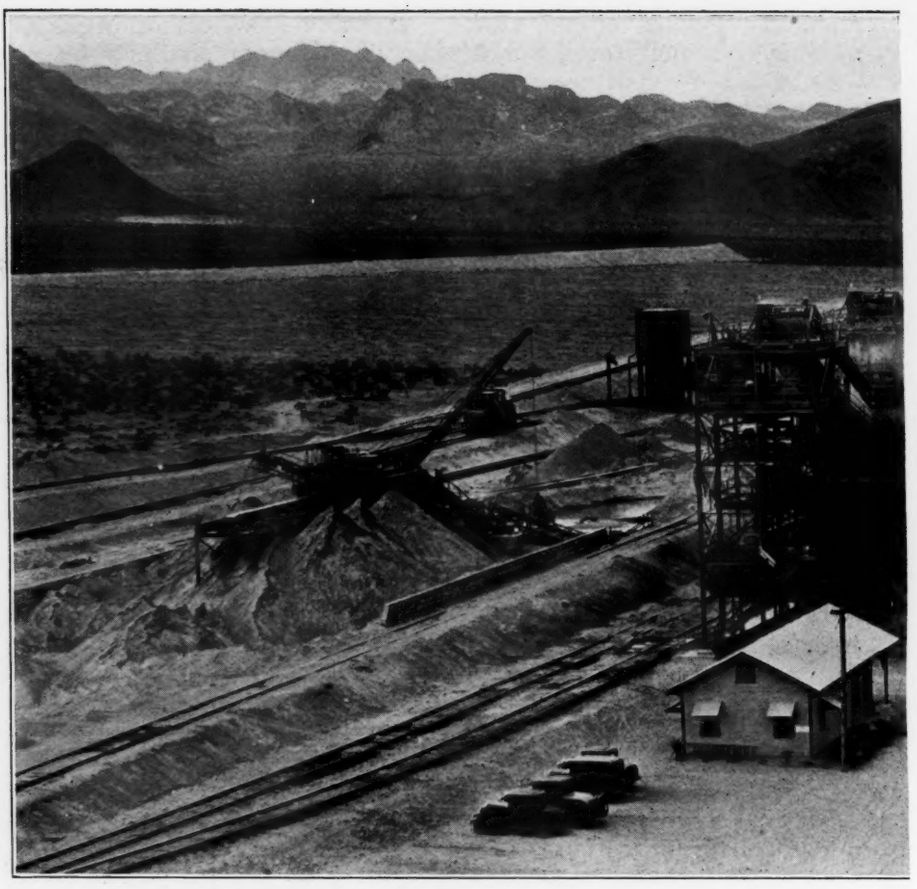
Get Behind the R. F. C.

WE hear increasingly numerous complaints of the dilatoriness of the Reconstruction Finance Corporation, of the seemingly interminable delay in getting it into action and the subsequent delays in getting it to make decisions. Some of the criticism leveled at this new government body is unquestionably warranted, but most of it that has come to our attention is the result of thwarted and unjustifiable personal expectations and of a ridiculous feeling of dependence.

The Reconstruction Finance Corporation is functioning; it is passing judgment on scores of projects, many of which do not deserve its approval under the terms of the law which created it; it is granting assistance in dozens of cases that will release millions of dollars for employment and the purchase of materials and equipment. But it can do much more than it has done, not because it operates slowly but rather because there are not as many worth-while proposals before it as there might be and these are not presented in the proper manner. If the corporation is to proceed more rapidly than it has proceeded, if it is to spread the benefits of construction more rapidly than it has spread them, the projects placed before it must be increased in number, they must be made more complete, and they must be more carefully scrutinized before they are presented.

Contractors, material producers, public officials, prominent citizens, everyone of influence, in short, must assume some of the responsibility and do some of the work necessary to determine what projects are deserving of R. F. C. aid, to present the projects with all the supporting evidence of engineering details, legal authority, and the like that is required, and to follow through until approval has been won and the requested money made available. It is not enough to rail at the corporation for its inactivity and wait for developments. To sit back and expect the Reconstruction Finance Corporation to remedy our economic ills automatically, without assistance, and even in the face of unjustified criticism is as illogical and as ineffective as closing one's doors and waiting for business to revive.

This article has been read and approved for publication by Dr. Elwood Mead, Commissioner of Reclamation, Washington, D. C., and by R. F. Walter, Chief Engineer, Bureau of Reclamation, Denver, Colo. It presents the latest and most authoritative account of the plant that has been published and will be followed by a similar article describing the concrete-mixing facilities.



Classification of Concrete

IN the Black Canyon of Colorado River, 70 mi. northwest of Kingman, Ariz., and 30 mi. southeast of Las Vegas, Nev., the government, through the Department of the Interior and directly by the Bureau of Reclamation, is building Hoover Dam. Construction activities are in charge of Walter R. Young, construction engineer, with headquarters in Boulder City. Designs and specifications for Hoover Dam, as well as all other projects of the Bureau of Reclamation, are prepared under the direction of J. L. Savage, chief designing engineer, and all engineering work of the bureau is under the supervision of R. F. Walter, chief engineer, both with headquarters at Denver, Colo. The entire activities of the bureau are under the general charge of Dr. Elwood Mead, Commissioner of Reclamation, Washington, D. C.

Another view of plant with sand stock-pile at right. Towers No. 2, 3 and 4 shown.

The dam structure, of monolithic concrete, will have a height of more than 730 ft., a base width of 650 ft. in the direction of the river's flow, a width across the crest of 45 ft. and along the crest of 1,180 ft. The mass of concrete in the dam itself will amount to 3,400,000 cu. yd., a greater volume than that of the Great Pyramid of Egypt. Another 1,000,000 cu. yd. of concrete will be poured in the tunnel linings, spillways, power-house, intake towers and other structures, making a total larger than that of the concrete poured in all the construction work of the Bureau of Reclamation in its 28 yr. of operation preceding the commencement of construction on the Boulder Canyon Project and including more than 40 dams.

To procure concrete of maximum strength from the aggregates economically available in the region of Black Canyon, the Bureau of Reclamation con-

Unloading side-dump cars into track hopper at plant.

By WESLEY R. NELSON
Asst. Engineer, Bureau
of Reclamation,
Boulder Canyon Project

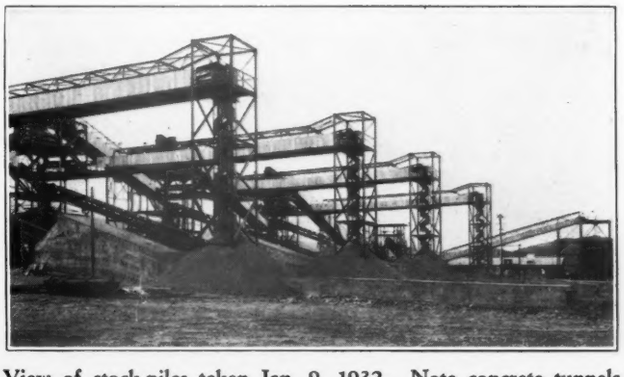
Left—General view of plant from the south. Sand stock-piles at left and raw-aggregate storage in background.

Aggregates for Hoover Dam

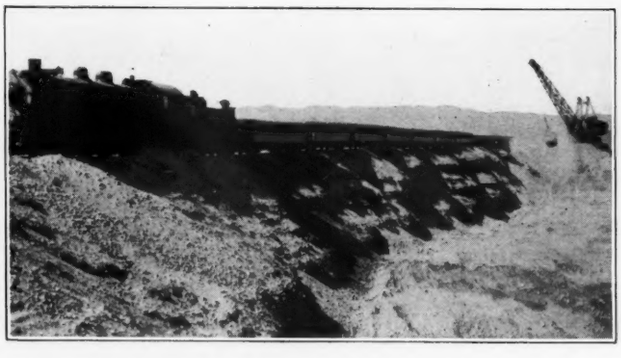
ducted tests of all potentially-feasible gravel deposits within a radius of 50 mi. of the dam site, finally choosing a deposit on the Arizona side of the river, approximately 8 mi. upstream from the site of Hoover Dam. The material at this location, termed the Arizona deposit, is well graded from gravel 12 in. in size to fine sand and is composed chiefly of limestone, granite, quartzite and quartz. The material is clean and well-rounded.

The deposit has an area of approximately 100 acres, and an average depth of 30 ft., less than 2½ ft. of which will require stripping and rejection. It is expected that 4,500,000 cu. yd. of aggregates will be available here, all of which will be used.

The Bureau of Reclamation, following its usual practice of preparing plans and specifications, inspecting and supervising all construction but allowing the actual operations to be performed by contracting firms or individuals, awarded the contract for the construction of Hoover Dam, the power-plant and appurtenant works to Six Companies, Inc., of San Francisco, in March, 1931. At that time the government was laying out a construction town site named Boulder City, at a location 7 mi. southwest of the dam site, and was building, by contract, a 132,000-v. transmission line 222 mi. in length from San Bernardino, Cal., to the project, a standard-gage railroad and an asphalt-macadam highway from the town site to the rim of Black Canyon, and a water-supply system from Colorado River to Boulder City.



View of stock-piles taken Jan. 9, 1932. Note concrete tunnels and rock ladders.



Trainload of gravel for plant, drag-line in background.

Six Companies, Inc., started work in Black Canyon during March and soon after extended its operations to include the construction of a railroad system connecting the government railroad from

Aërial view of Arizona deposit and Colorado River, looking upstream. Deposit is in center of picture on right side of river.

Boulder City with the Arizona deposit and the Black Canyon operations, forming a 3-way junction in Hemenway Wash, where the contractor, in November, 1931, commenced the erection of a concrete-aggregate screening-and-washing plant.

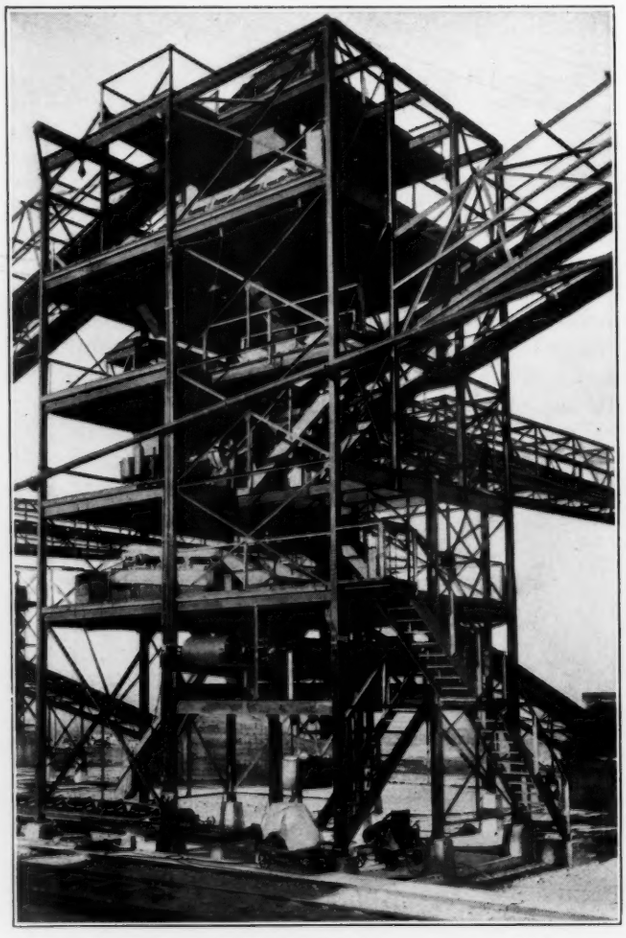
The first run of gravel was classified on Jan. 9, 1932, when Assistant Chief Engineer S. O. Harper, of the Bureau of Reclamation, closed the switch placing the plant in operation. The material for this test run was secured near the plant, as the railroad to the Arizona deposit, crossing Colorado River on an 850-ft. pile-trestle bridge, was not completed until Feb. 6, when gravel was first loaded out to the screening plant from the deposit.

Although it is expected that Hoover Dam will not be completed until 1937, all the required material must be hauled from the site and used or stored by 1935, as in that year water will start rising in the reservoir back of the partially-completed dam and the site of the Arizona deposit may be inundated to a depth of 200 ft. or more. This is due to the fact that after the dam is completed to an elevation above the gates of the intake towers, two of the four diversion tunnels that will at that time be carrying water around the dam site will be closed and the river will flow past the dam through gates installed in the two diversion tunnels remaining open, and through gates in the two upstream intake towers. These last-mentioned gates will be situated at an elevation approximately 200 ft. above the aggregate deposits and water will flow through them in case river floods develop beyond the capacity of the diversion-tunnel gates or should the government desire to run water through the penstocks and turbines connecting with the tunnels from the intake towers for the manufacture of electrical energy.

Operations at the Arizona deposit are conducted on a 3-shift basis and the screening plant works 2 shifts daily. Concrete aggregates are now loaded out from the pit at an average rate of nearly 200 cars of 30-cu. yd., 50-ton. capacity every 24 hr., 60 per cent. of the material in these being screened and stored in stock-piles or in classified storage-piles and the remainder placed in raw storage. Three trains are in constant service between the deposit and the plant, requiring about 2½ hr. for the round trip.

Storage of unclassified aggregates is necessary in order to remove all desirable materials from the Arizona deposit by 1935, as previously stated, and in addition, to insure continuous operation of the plant over a long period should railroad transportation from the pit be cut off by washouts or other contingencies. The area available for raw storage is sufficiently large to accumulate the entire Arizona deposit.

The site for the storage of classified aggregates is above the maximum high-water surface of the lake that will form back of the completed dam. The



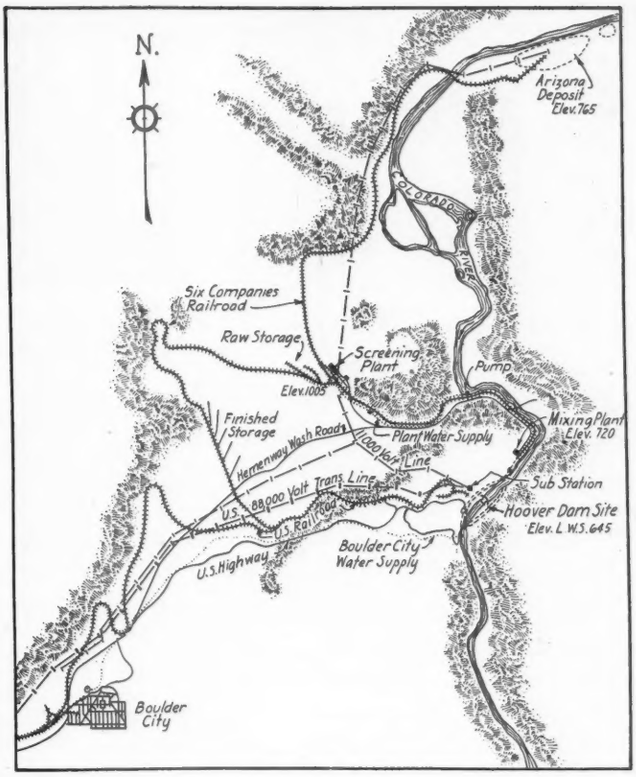
Construction view of tower No. 3, showing screens and conveyors.

contractor plans to supply aggregates from the stock-pile at the screening plant to the concrete-mixing plant in Black Canyon for lining the diversion tunnels and for early construction of the dam and accessory features. Aggregates are to be taken from the classified storage-piles for the mixing plant that is to be erected on the rim of Black Canyon for pouring the upper portion of the dam and the works appurtenant thereto.

As indicated above, the screening plant at present is classifying about 375 tons of aggregates an hour. It is capable of producing 500 tons of finished material in an hour and, with a few alterations, its capacity can be increased to 1,000 tons per hour. The enlargement of the plant may be found advisable should the demands of the two concrete plants require such action, or in the event the necessity arises for terminating the screening operations some time in advance of completion of the dam.

The screening plant is located near the lower end of Hemenway Wash, about 2 mi. west of the river, 5 mi. by transportation line from the dam site, and at an elevation 240 ft. above the Arizona deposit. As mentioned above, the contractor's railroad forms a 3-way junction at the plant, one branch leading to the government railroad, another to the gravel pits, and the third into Black Canyon. The storage site for unclassified gravel is situated west of the plant, while classified aggregates are stored on the railroad line between the plant and the government railroad. Live storage in the stock-piles at the plant amounts to about 1,600 tons of cobbles, 1,700 tons of each size of gravel, and there is a total storage capacity for 9,000 tons of sand.

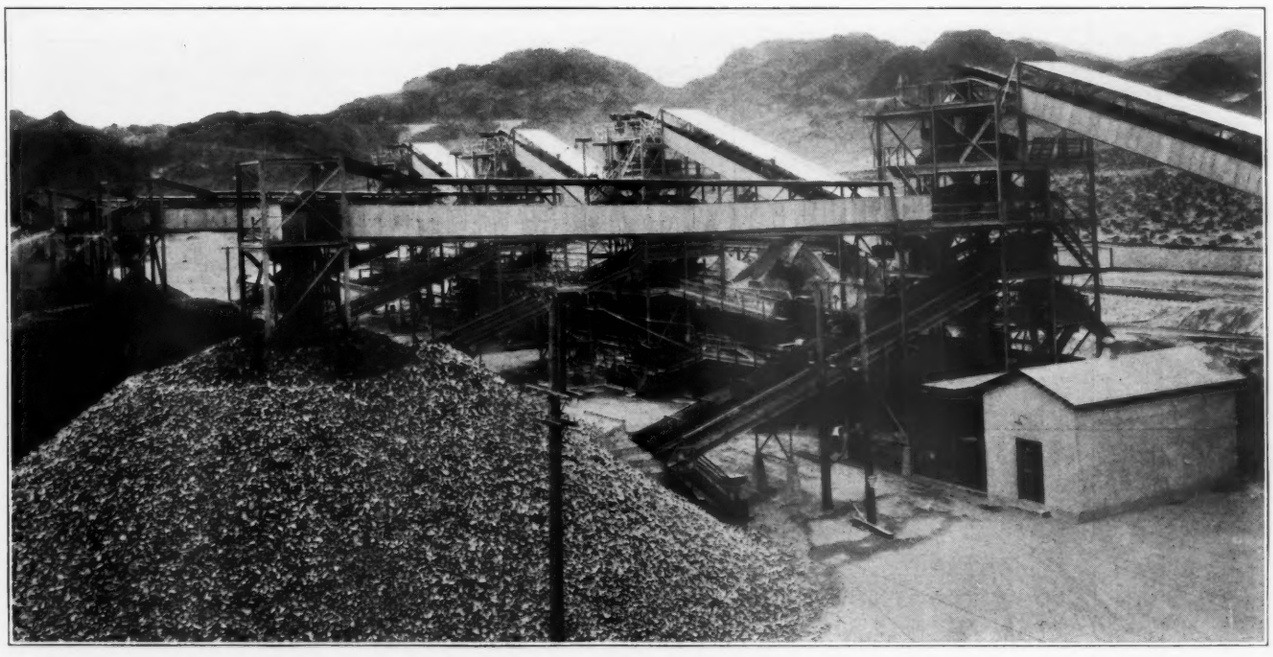
The screening plant was designed and is operated to conform with the requirements contained in Specifications No. 519, governing the contract between the United States and Six Companies, Inc.



Map of Hoover Dam area, showing locations of gravel deposit, plant, dam site, etc.

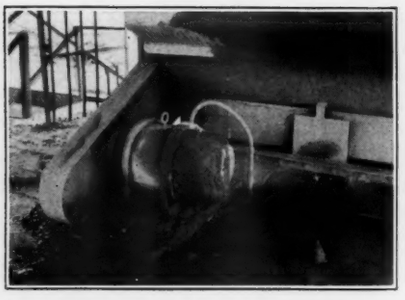
The following excerpts influencing the plant construction are taken *verbatim* from the specifications:

". . . The sand particles shall be hard, dense, durable, uncoated, nonorganic rock fragments that will pass a ¼-in. square or a 5/16-in. round opening. It [the sand] must be free from injurious amounts of dust, lumps, soft or flaky particles, shale, alkali, organic matter, loam, mica, or other

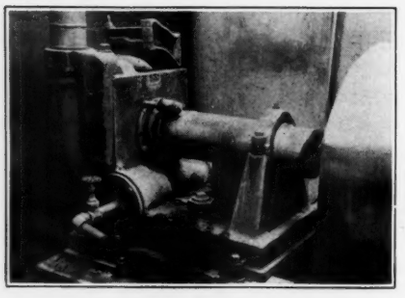


General view of plant with gravel storage-piles, stock-piling conveyors, stone ladders, and reclaiming conveyors clearly shown. Substation in right foreground.

The gyratory crusher with shaker feeder at left.



Ten-hp. motor driving one of the vibrating screens.



The 6-in. pump used for rehandling waste.

deleterious substances. The sand as it is used in the concrete must be so graded that concrete of the required workability, density, and strength can be made without the use of excess of water or cement. The sand for concrete shall have a fineness modulus of not less than 2.75 nor more than 3.25, unless approval is given by the contracting officer to use sand not meeting this requirement. The fineness modulus will be determined by dividing by 100 the sum of the percentages retained on Tyler standard sieves, Nos. 4, 8, 14, 28, 48 and 100. The suitability of the sand will be determined by the contracting officer with the aid of tests made in accordance with the standard practice of the United States Bureau

TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE BOULDER DAM AGGREGATES PLANT AT BOULDER CITY, COLO.
(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

Operation	Key	Equipment	Make	Model No., Size, Capacity or Type	Power Source	Power Transmission
Shipping, loading, and transportation		Drag-line	Marion	No. 125, 5-cu. yd.	250-hp. Westinghouse motor	Gear
		Steam locomotives (6)		109-ton Mikado; 99-ton Consolidation; 30-ton Shay		
		Gasoline locomotives (2)	Plymouth	30-ton		
		Cars (116)	Western	34 drop-door; 32 lift-door; 50 hopper—all 50-ton, 30-cu. yd., air-dump		
Raw-material receiving	1	Bin	Own	30-car capacity, concrete		
	2	Feeders (9)	Traylor	200-ton per hr., vibrating	Solenoids	
	3	Belt-conveyor (A)	(1)	42-in., 264-ft. centers, 600-ton per hr.	60-hp. Westinghouse motor	Falk reducer
Scalping and crushing	4	Scalping screen (Oversize to $4a_1$; throughs to 5)	Bodinson	60-in. by 16-ft.	40-hp. Westinghouse motor	Falk reducer
	$4a_1$	Belt-conveyor (B)	(1)	30-in., 178-ft. centers, 200-ton per hr.	15-hp. Westinghouse motor	Falk reducer
	$4a_2$	Bin				
	$4a_3$	Feeder	Bodinson	200-ton per hr., shaker	10-hp. Westinghouse motor	Texrope
	$4a_4$	Crusher	Allis-Chalmers	McCully gyratory 16-in., 200-ton per hr.,	100-hp. Westinghouse motor	Texrope
	$4a_5$	Belt-conveyor (C)	(1)	24-in., 160-ft. centers, 200-ton per hr.	7½-hp. Westinghouse motor	Falk reducer
	5	Belt-conveyor (E) (To 6 [a] and 6 [aa]	(1)	36-in., 209-ft. centers, 600-ton per hr.	75-hp. Westinghouse motor	Falk reducer
Classification: 1st stage (Tower 1)		(From 5)				
	6[a]	Screen (Oversize to $6a_1$; throughs to 7 [a])	Robins	4-ft. by 12-ft., single-deck vibrating, 2¾-in. sq. mesh	7½-hp. Westinghouse motor	Texrope
(Removal of 3-in. to 9-in.)		(From 5)				
	6[aa]	Screen (Top-deck and bottom-deck oversize to $6a_1$; bottom-deck throughs to 7 [aa])	Symons	4-ft. by 12-ft., double-deck vibrating, 3¼-in. top, 2¾-in. bottom	7½-hp. Westinghouse motor	Texrope
		(From 6 [a] and 6 [aa])				
	$6a_1$	Belt-conveyor (F)	(1)	30-in., 134-ft. centers, 175-ton per hr.	10-hp. Westinghouse motor	Falk reducer
	$6a_2$	Stock-pile				
	$6a_3$	Feeder	Traylor			
	$6a_4$	Belt-conveyor (G)	(1)	30-in., 158-ft. centers, 400-ton per hr.	50-hp. Westinghouse motor	Falk reducer
	$6a_5$	Screen (Top-deck oversize to $6a_6$; bottom-deck oversize to 6b; bottom-deck throughs to $6c_1$)	Robins	4-ft. by 10-ft., double-deck vibrating, 2¾-in. top, ¼-in. bottom	5-hp. Westinghouse motor	Texrope
	$6a_6$	Hopper (Material to cars; drippage to $6c_1$)	Own			
		(From 6 [a])				
	7 [a]	Screen (Top-deck and bottom-deck oversize to 8; bottom-deck throughs to $7a_1$)	Symons	4-ft. by 12-ft., double-deck vibrating, ¾-in. top, ¼-in. bottom	7½-hp. Westinghouse motor	Texrope
		(From 6 [aa])				
	7[aa]	Screen (Top-deck and bottom-deck oversize to 8; bottom-deck throughs to $7a_1$)	Symons	4-ft. by 12-ft., double-deck vibrating, ¾-in. top, ¼-in. bottom	7½-hp. Westinghouse motor	Texrope
		(From 7 [a] and 7 [aa])				
	8	Belt-conveyor (H)	(1)	30-in., 113-ft. centers, 400-ton per hr.	25-hp. Westinghouse motor	Falk reducer

[1]Pulleys by Link-Belt, idlers by Stearns, belting by Pioneer Rubber.

(*Continued on next page.*)

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TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE BOULDER DAM AGGREGATES PLANT AT BOULDER CITY, COLO.
(Contd.)
(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

Operation	Key	Equipment	Make	Model No., Size, Capacity or Type	Power Source	Power Transmission
Classification: 2d stage (Tower 2)	9	Screens (2) (Top-deck and bottom-deck oversize to $9a_1$; bottom-deck throughs to 10)	Symons	4-ft. by 10-ft. double-deck vibrating, 2-in. top, 1½-in. bottom	7½-hp. Westinghouse motors (2)	Texrope
(Removal of 1½-in. to 3-in.)	$9a_1$	Belt-conveyor (F1)	(1)	30-in., 134-ft. centers, 175-ton per hr.	10-hp. Westinghouse motor	Falk reducer
	$9a_2$	Stock-pile				
	$9a_3$	Drop-chute gate	Own		Westinghouse motor	Gears, chain and cable
	$9a_4$	Belt-conveyor (G1)	(1)	30-in., 158-ft. centers, 400-ton per hr.	50 hp. Westinghouse motor	Falk reducer
	$9a_5$	Screen (Top-deck oversize to $9a_6$; bottom-deck oversize to 6b; bottom-deck throughs to $6c_1$)	Symons	4-ft. by 10-ft., double-deck vibrating, 1½-in. top, ¼-in. bottom	5-hp. Westinghouse motor	Texrope
	$9a_6$	Shuttle conveyor (L) (Oversize to cars; throughs to $6c_1$)	(1)	48-in., 20-ft. centers, 400-ton per hr.	5-hp. Westinghouse motor	Falk reducer
	10	Belt-conveyor (I)	(1)	24-in., 90-ft. centers, 300-ton per hr.	15-hp. Westinghouse motor	Falk reducer
Classification: 3d stage (Tower 3)	11	Screens (2) (Top-deck and bottom-deck oversize to $11a_1$; bottom-deck throughs to 12)	Symons	4-ft. by 10-ft., double-deck, vibrating, 1⅛-in. top, ¾-in. bottom	7½-hp. Westinghouse motors (2)	Texrope
(Removal of ¾-in. to 1½-in.)	$11a_1$	Belt-conveyor (F2)	(1)	24-in., 134-ft. centers, 150-ton per hr.	10-hp. Westinghouse motor	Falk reducer
	$11a_2$	Stock-pile				
	$11a_3$	Drop-chute gate	Own		Westinghouse motor	Gears, chain and cable
	$11a_4$	Belt-conveyor (G2)	(1)	30-in., 158-ft. centers, 400-ton per hr.	50-hp. Westinghouse motor	Falk reducer
	$11a_5$	Screen (Top-deck oversize to $11a_6$; bottom-deck oversize to 6b; bottom-deck throughs to $6c_1$)	Symons	4-ft. by 10-ft., double-deck vibrating, ¾-in. top, ¼-in. bottom	5-hp. Westinghouse motor	Texrope
	$11a_6$	Shuttle conveyor (L1) (Oversize to cars; throughs to $6c_1$)	(1)	48-in., 20-ft. centers, 400-ton per hr.	5-hp. Westinghouse motor	Falk reducer
	12	Belt-conveyor (J)	(1)	24-in., 90-ft. centers, 150-ton per hr.	10-hp. Westinghouse motor	Falk reducer

[1]Pulleys by Link-Belt, idlers by Stearns, belting by Pioneer Rubber.

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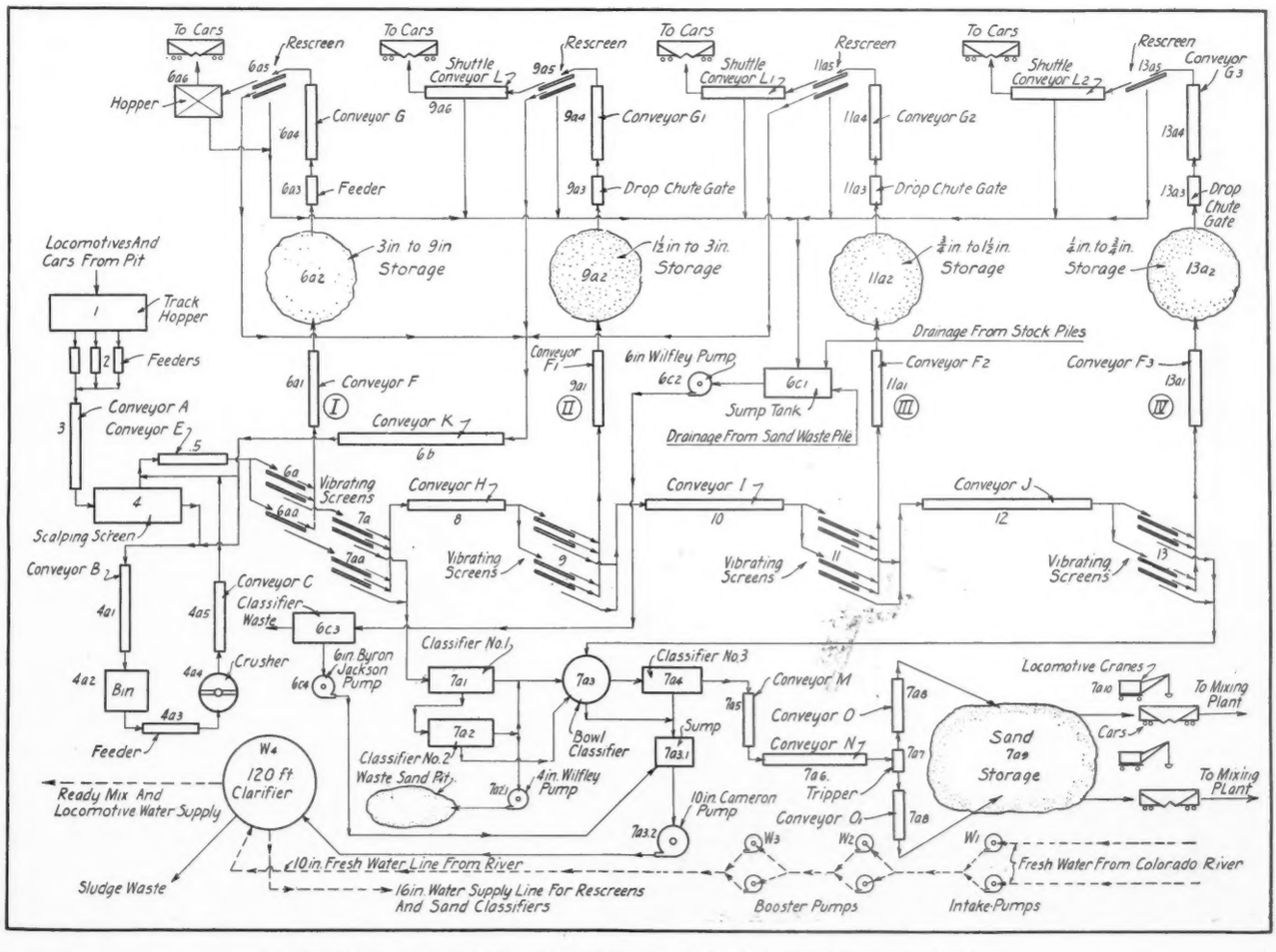


Flow-sheet of operations and equipment of the Hoover Dam gravel plant.

TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE BOULDER DAM AGGREGATES PLANT AT BOULDER CITY, COLO.
(Contd.)
(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

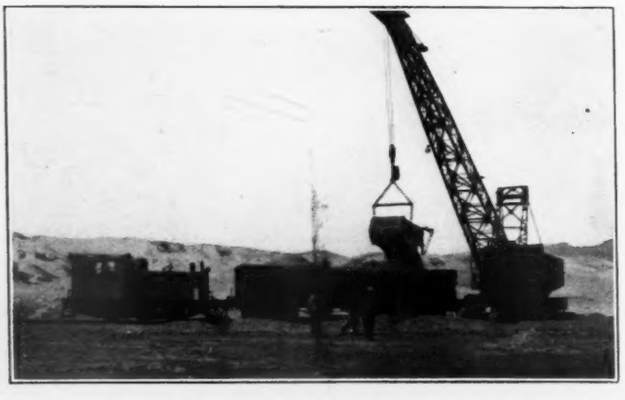
Operation	Key	Equipment	Make	Model No., Size, Capacity or Type	Power Source	Power Transmission
Classification: 4th stage (Tower 4)	13	Screens (2) (Top-deck and bottom-deck oversize to $13a_1$; bottom-deck throughs to $7a_3$)	Symons	4-ft. by 10-ft. double-deck vibrating, ½-in. top, ¼-in. bottom	7½-hp. Westinghouse motors (2)	Texrope
(Removal of ¼-in. to ¾-in.)	$13a_1$	Belt-conveyor (F3)	(1)	24-in., 134-ft. centers, 150-ton per hr.	10-hp. Westinghouse motor	Falk reducer
	$13a_2$	Stock-pile			Westinghouse motor	Gears, chain and cable
	$13a_3$	Drop-chute gate	Own			
	$13a_4$	Belt-conveyor (G3)	(1)	24-in., 158-ft. centers, 400-ton per hr.	50-hp. Westinghouse motor	Falk reducer
	$13a_5$	Screen (Oversize to $13a_6$; throughs to $6c_1$)	Symons	4-ft. by 10-ft. single-deck vibrating, ¼-in.		Texrope
	$13a_6$	Shuttle conveyor (L2) (Oversize to cars; throughs to $6c_1$)	(1)	48-in., 20-ft. centers, 400-ton per hr.	5-hp. Westinghouse motor	Falk reducer
Reclassification	6b	(From $6a_5$, $9a_5$ and $11a_5$) Belt-conveyor (K) (To $4a_1$ or 5)	(1)	24-in., 470-ft. centers, 100-ton per hr.	20-hp. Westinghouse motor	Falk reducer
Sand classification and washing		(From 7 [a] and 7 [aa])				
	$7a_1$	Classifier (No. 1)	Dorrco	Rake, F, 8-ft. (2)	10-hp. Westinghouse motor	Texrope
	$7a_2$	Classifier (No. 2) (Optional waste of medium-size sand to $7a_{2.1}$)	Dorrco	Rake, F, 8-ft. (2)	10-hp. Westinghouse motor	Texrope
		(From $7a_2$ and 13)				
	$7a_3$	Bowl classifier (Overflow to $7a_{2.1}$)	Dorrco	20-ft. diameter, traction	5-hp. Westinghouse motor	Texrope
	$7a_4$	Classifier (No. 3)	Dorrco	Rake, F, 16-ft.	20-hp. Westinghouse motor	Texrope
	$7a_5$	Belt-conveyor (M)	(1)	24-in., 122-ft. centers, 225-ton per hr.	7½-hp. Westinghouse motor	Falk reducer
	$7a_6$	Belt conveyor (N)	(1)	24-in., 186-ft. centers, 225-ton per hr.	25-hp. Westinghouse motor	Falk reducer
	$7a_7$	Tripper	Bodinson	Aëroplane, 225-ton per hr.	5-hp. Westinghouse motor	Falk reducer
	$7a_8$	Belt-conveyors (O) (2)	(1)	24-in., 15-ft. centers, 112-ton per hr.	20-hp. Westinghouse motor (for both)	Falk reducer
	$7a_9$	Stock-pile				
	$7a_{10}$	Railroad cranes (2)	Brownhoist	1¾-cu. yd.	80-hp. Diesel engine (for each)	Gear
Reclaiming of waste water	$6c_1$	Sump tank				
	$6c_2$	Pump	Wilfley	6-in., centrifugal	50-hp. Westinghouse motor	Direct
	$6c_3$	Classifier (Overflow to waste; product to $6c_4$)	Bodinson			
	$6c_4$	Pump (To $7a_{2.1}$)	Byron-Jackson	6-in., centrifugal	40-hp. Westinghouse motor	Direct
	$7a_{2.1}$	Sump				
	$7a_{2.2}$	Pump	Cameron	10-in., centrifugal	200-hp. Westinghouse motor	Direct
Water-supply	W_1	Pumps (2)	Byron-Jackson	4-in., centrifugal, 450-gal. per min., 200-ft. head	40-hp. Westinghouse motor	Direct
	W_2	Booster pumps (2)	Byron-Jackson	4-in., centrifugal, 450-gal. per min., 200-ft. head	40-hp. Westinghouse motor	Direct
	W_3	Booster pumps (2)	Byron-Jackson	4-in., centrifugal, 450-gal. per min., 200-ft. head	40-hp. Westinghouse motor	Direct
	W_4	Clarifier (Water to plant water-supply lines)	Dorrco	120-ft. diameter, 800,000-gal., traction	5-hp. Westinghouse motor	Reducer
Waste sand	$7a_{2.1}$	Pump (To waste-sand pit)	Wilfley	4-in., centrifugal	10-hp. Westinghouse motor	
Stock-pile storage		Lowering ladders (4)	Own			
		Water-sprays (4)	Own	Binks nozzles, 50-gal. per min.		
		Hoppers and gates	Own			

[1]Pulleys by Link-Belt, idlers by Stearns, belting by Pioneer Rubber.
[2]Equipped with Reeves variable-speed transmissions.

of Standards. The sand shall be washed unless specific written authority is given by the contracting officer to use unwashed sand. . . ."

"The broken rock or gravel for concrete must be hard, dense, durable, uncoated rock fragments free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, organic or other deleterious matter. It shall be so graded that concrete of the required workability, density, and strength can be made without the use of an excess of sand, water, or cement. The broken rock or gravel shall all pass through a screen having 2¾-in. square or 3-in. round openings and shall be retained on a screen having ¼-in. square or 5/16-in. round openings. It shall also be separated into three intermediate sizes by screens having ¾-in. square or ⅞-in. round openings, and 1½-in. square or 1¾-in. round openings. Screens having openings of other sizes or shapes may be used, provided that equivalent results, as determined by the contracting officer, are obtained . . ."

"Cobble rock shall in general be added to the mix. Such cobble rock shall be sound, clean gravel or broken rock of such size as will pass through a

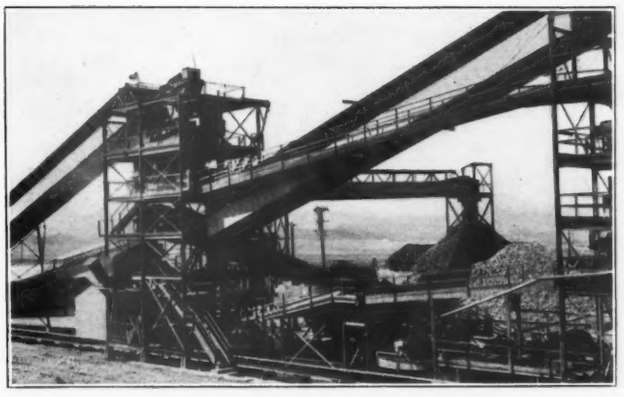


Drag-line loading into 50-ton cars at the Arizona gravel pit.

screen having 8-in. square or 9-in. round openings and be retained on a screen having 2¾-in. square or 3-in. round openings. The amount of such cobble rock to be used shall be as determined by the contracting officer, based on producing the most economical concrete of the required strength and, in so far as practicable, utilizing the entire yield of the natural deposit or quarry from which the broken rock or gravel is obtained. . . . The use of cobble rock will not be required or permitted where the concrete is reinforced, or in any concrete structure the least dimension of which is less than 30 in."

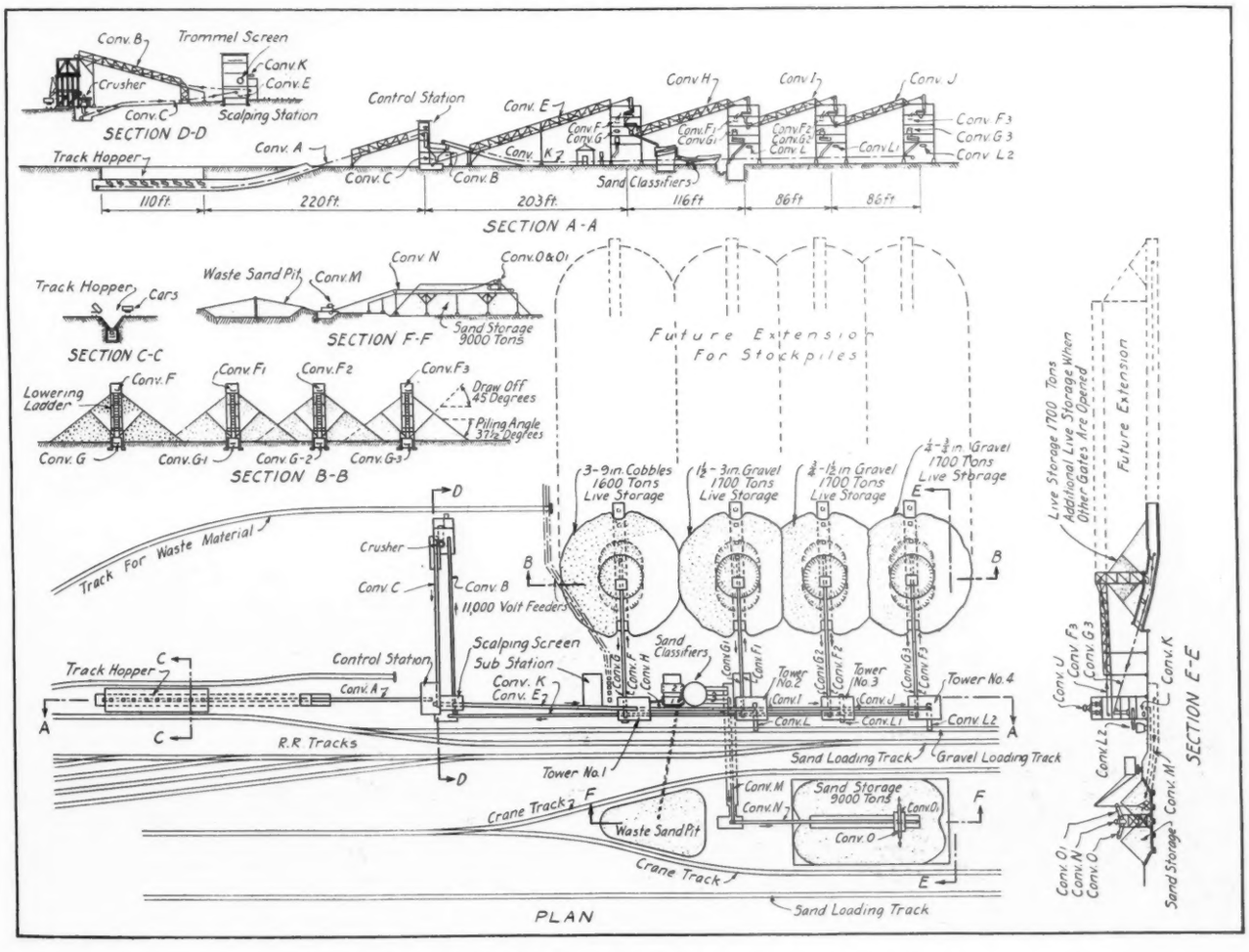
In general, the separation of the aggregates is secured by running the pit material through a scalping screen, crushing the oversize, removing the cobbles, screening and washing the sand, and dividing the gravel into large, intermediate, and small sizes. Four structural-steel towers, 20 ft. by 30 ft. in plan and 60 ft. high, equipped with vibrating screens, connected to each other and to the stockpiles by steel trusses supporting conveyor belts, form the principal classification portion of the plant. A 30-car track-hopper, a scalping-screen station with a control tower and an attendant crusher, sand-classifier, washers, and storage facilities, the water-supply system and railroad facilities are other important features of the plant.

Raw aggregates, loaded at the Arizona deposit into 50-ton Western air side-dump railroad cars by

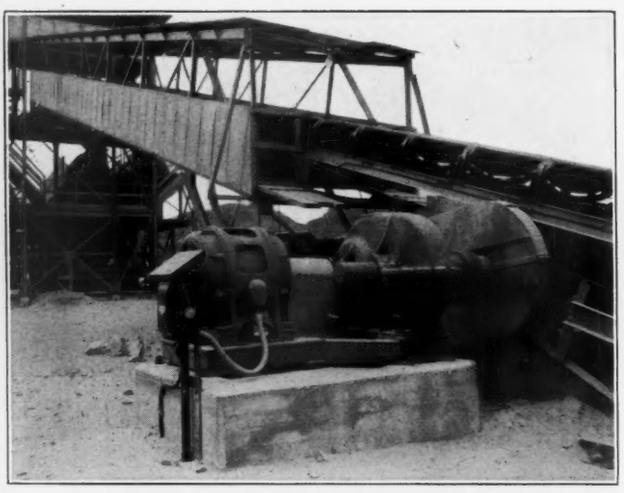


Tower No. 1 with sand classifiers in foreground and cobble stock-pile in background.

a Marion electric drag-line equipped with a 5-cu.yd. bucket and an 80-ft. boom, are hauled in trains of 8 to 10 cars by Consolidation-type steam locomotives over 7 mi. of standard-gage railroad to the concrete bunkers of the classification plant. Dumped into the bunkers, by air-control from the locomotive, the aggregates pass at the direction of the control operator in the scalping tower through Traylor vibrating feeders to the 42-in. supply conveyor A, and thence to the rotary screen, 5 ft. in diameter and 16 ft. long, in the scalping station. The 9-in. round holes of the cylindrical screen re-



Plan of the Hoover Dam gravel plant with cross-sectional elevations.



Motor and speed-reducer drive of conveyor A.

tain the oversize, which drops into a hopper opening on the 30-in. belt of conveyor B and is transported to a supply bin above a 16-in. McCully Superior No. 16 gyratory crusher.

A Bodinson reciprocating feeder drops the material from the supply bin into the crusher bowl. The rock is reduced to 6 in. or less, dropped on 24-in. conveyor C, and returned to the system at conveyor E back of the scalping screen.

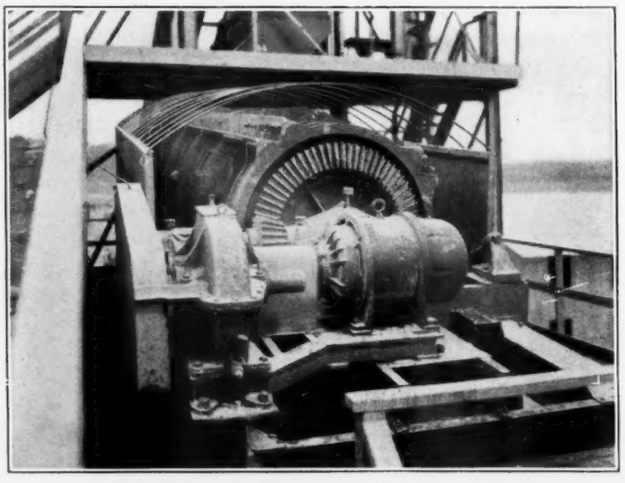
Aggregates passing through the scalping screen and the broken rock returned from the crusher are fed to 36-in. belt-conveyor E and are carried to the screens of classification tower No. 1. A Robins 2¾-in. square-opening single-deck screen and a Symons 3¼-in. top-deck and 2¾-in. lower-deck screen, acting in parallel, receive the aggregates and remove the 3-in. to 9-in. cobbles, dropping the residuum to two parallel Symons vibrating screens, each of ¾-in. top, and ¼-in. bottom deck. The gravel above ¼ in. in size moves across these screens to the hopper leading to 30-in. belt-conveyor H, while the material passing through the screens, classified as sand, drops into a chute leading to the sand-washers.

Cobbles, shunted by the first pair of screens to 30-in. belt-conveyor F, are transported to a lowering ladder and thence to the stock-pile.

The sand dropped by the pair of Symons screens is conveyed by water, flowing in a 12-in. steel launder-chute, to a series of three Dorrco classifiers, two of 8-ft. rake type F, and the other a combination of 20-ft.-diameter bowl and 16-ft. rake. Analysis of sand from the Arizona deposit has shown an excess of material between Tyler sieves Nos. 28 and 48, and an arrangement has been made in the sand-washing operations to remove the required percentage of the sand of this size.

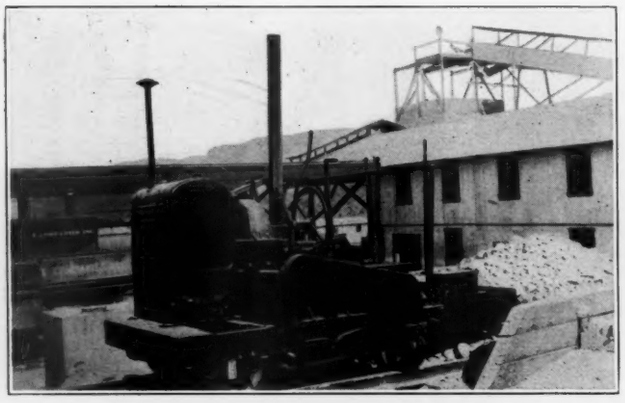
The classifiers are arranged in series, with the combination bowl and rake occupying the third position. Each of classifiers Nos. 1 and 2 is equipped with two rakes, the bowl is fitted with a traction clarifier, and the attached rake classifier has four rakes installed in it. The bottoms of the rake-classifier tanks are placed at an angle between 10 deg. and 15 deg. from the horizontal.

Material from the sand-screens enters the lower end of classifier No. 1 through a spreader chute, and



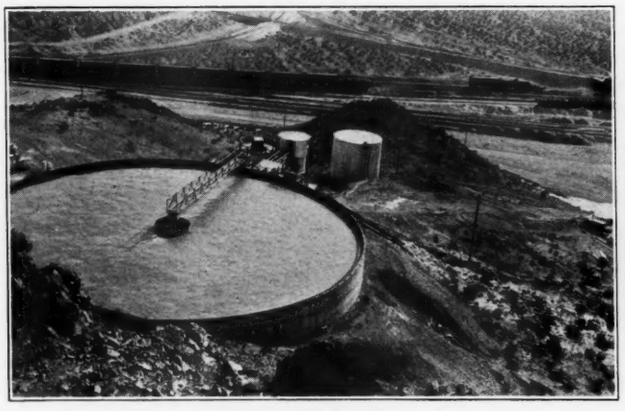
Fifty-hp. motor and speed-reducer driving scalping screen.

the pair of broad-bladed rakes operating on an eccentric motion progressively move the sand from the lower end of the tank to the lip at the upper end, where it drops into a water-carrying chute and is transported off center of the bowl classifier. The effluent carrying the finer sand overflows the tank rim at the end opposite the lip and passes into classifier No. 2. In similar manner sand is raked to the lip of the second classifier and chuted to the bowl; the effluent overflows from the opposite end, also entering the bowl. A hinged baffle plate, installed in the throat of the chute below the lip of



Track-shifter used about plant and raw-material storage.

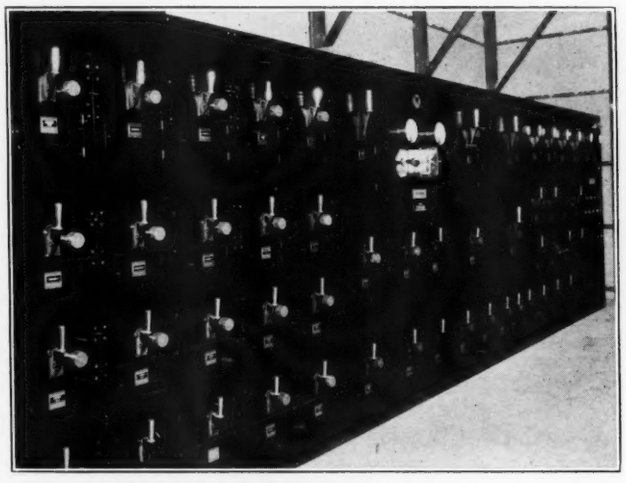
Sand-classifying equipment from the top of the loading tower.



The 120-ft. traction clarifier which cleans water for the plant.

One of the vibrating screens in classification tower No. 1.

classifier No. 2, shunts from one-third to one-half of the sand to a Wilfley reject pump in order to eliminate a certain amount of the finer material classified as retainable on Tyler sieve No. 48. The rakes of classifiers Nos. 1 and 2 are equipped with Reeves transmissions, allowing them to be operated at variable speeds, thus procuring control of gradation in the material overflowing the lips of the classifiers. Further control of the sand gradation in the classifiers is secured by changing the amount of water flowing in the launder-chute from the sand-screens.



Front view of switchboard in substation.

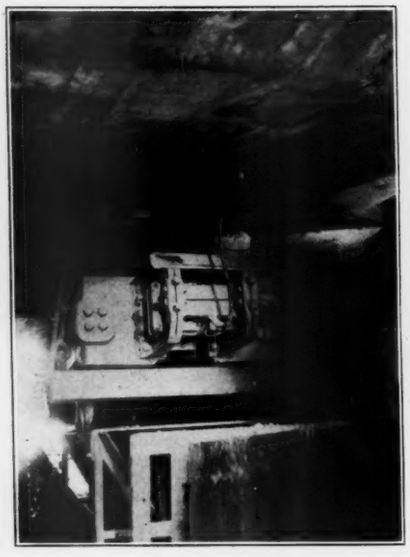
The bowl classifier, equipped with a Dorrco 20-ft.-diameter traction clarifier, washes the influent from classifiers Nos. 1 and 2, passing the washed sand through an orifice in the center and bottom of the bowl to the attached rake classifier and allowing the effluent to overflow the bowl rim and pass to the Cameron return pump. The rake classifier, attached to the bowl, drops the washed sand over its lip to 24-in. belt-conveyor M, which transports the sand beneath the railroad loading tracks to 24-in. transverse conveyor N leading to a Bodinson aëroplane tripper, thence to 24-in. conveyors O and O 1 and the sand stock-pile. Sand is unloaded from the tripper on both sides of a structural-steel trestle which supports the tripper track. The aëroplane tripper and its attached conveyors, O and O 1, travels back and forth on the track, thus scattering the sand the full length of the stock-pile and securing a more uniform gradation of size and moisture content. An Industrial Brownhoist railroad crane, equipped with 1¾-cu.yd. clam-shell bucket, is used for loading sand from the stock-piles into railroad cars.

The sand rejected from classifier No. 2 is pumped to the sand waste-pile, north of the sand stock-pile, by a 4-in. Wilfley pump. The overflow from classifier No. 3 passes to a sump tank and is lifted by a Cameron 10-in. centrifugal pump and direct-connected 200-hp. motor to the clarification system, which is on the hill southeast of the plant and will be described later.

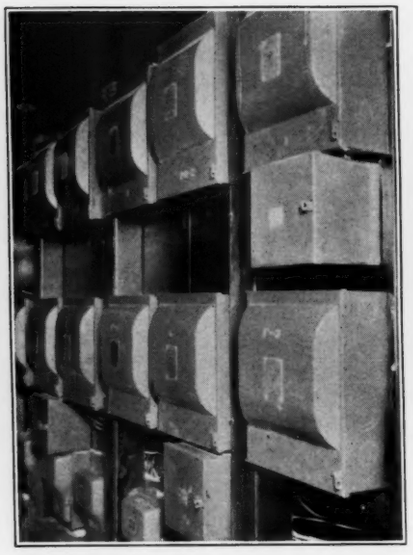
Tile drains beneath the sand stock-pile carry the excess water which has filtered through the sand to a sump tank, joining there the wash-water from gravel-washing operations and the water from the waste-sand pile. A Wilfley 6-in. centrifugal pump, powered by a 50-hp. motor, lifts the water and included sand to a Bodinson twin-rake classifier, situated on the hill southeast of the plant, where the sand is removed. The residual water, through a connection with the main return-line from the plant, is lifted to the clarification plant by a Byron-Jackson 6-in. centrifugal pump operated by a 40-hp. motor.

Returning to the gravel classification, the 3-in.

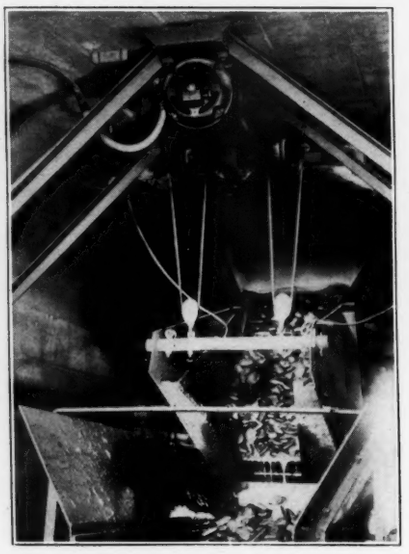
Push-button control-board in central control-tower.



Vibrating feeder in cobble stock-pile reclaiming tunnel.



Rear view of switchboard in substation, showing switch-boxes.



Motor-operated feeder in gravel-reclaiming tunnel.

minus material is dumped from conveyor H on the two Symons 2-in. square top and 1½-in. square bottom vibrating screens of classification tower No. 2 and the 1½-in. to 3-in. gravel is removed by 30-in. conveyor F-1 to its stock-pile. In like manner the ¾-in. to 1½-in. gravel and the ¼-in. to ¾-in. gravel is abstracted respectively at towers Nos. 3 and 4 and conveyed to the stock-piles by conveyors F-2 and F-3. The screens of tower No. 3 are two Symons 1⅛-in. top and ¾-in. bottom-deck acting in parallel and those of No. 4 two Symons ½-in. top and ¼-in. bottom deck. Conveyor I carries material from tower No. 2 to No. 3 and conveyor J from No. 3 to No. 4.

Loading the gravel into railroad cars is accomplished by 30-in. belt-conveyors (G to G-3 inclusive) leading from 9-ft. by 11-ft. concrete tunnels beneath the stock-piles to reclassification screens (6a5, 9a5, 11a5 and 13a5 on the flow-sheet), shuttle conveyors (L to L2), or hopper (6a6 in the case of tower No. 1), and thence to the cars.

In the roof of the reinforced-concrete tunnel beneath each gravel stock-pile are several openings, some of which are closed by steel plates bolted on the inside of the tunnel. A remote-controlled electrically-operated drop-chute gate is installed at an opening beneath each of the gravel stock-pile towers, and additional gates may be placed at the other openings whenever it is desirable to secure a drawdown from some other location. A Traylor vibrating feeder has been placed in the roof of the reclaiming tunnel of the cobble stock-pile.

Construction view of plant with scalping tower at left and tower No. 1 in center.

Gravel from the stock-piles passes through the hoppers and electrically-controlled gates to the 30-in. return belt-conveyors, which carry it to square-holed vibrating reclassification screens situated on the lower decks of the classification towers. In tower No. 1 the screen is a Robins 2¾-in. top, ¼-in. bottom; in No. 2, a Symons 1½-in. top, ¼-in. bottom; in No. 3, a Symons ¾-in. top, ¼-in. bottom; and in No. 4, a Symons ¼-in. single deck. The off-size retained on the lower deck of the double-deck screens drops on 24-in. conveyor K and is transported to the scalping station, where it is returned to conveyor E or sent by conveyor B to the crusher-bin, depending on whether or not the plant is in operation for classification. The material passing through the lower decks is transported by water through a pipe-line to the Wilfley 6-in. return pump.

In towers 2, 3, and 4 the gravel retained on the top deck of the reclassification screen drops on a 48-in. perforated conveyor (L to L2 inclusive) and is carried to hopper-bottom dump railroad cars. As the gravel leaves the screen it is thoroughly washed by water-jets, the excess water flowing through the perforated belt of the conveyor to a pipe-line and thence to a sump tank, whence it is returned by the 6-in. Wilfley centrifugal pump to the sedimentation plant.

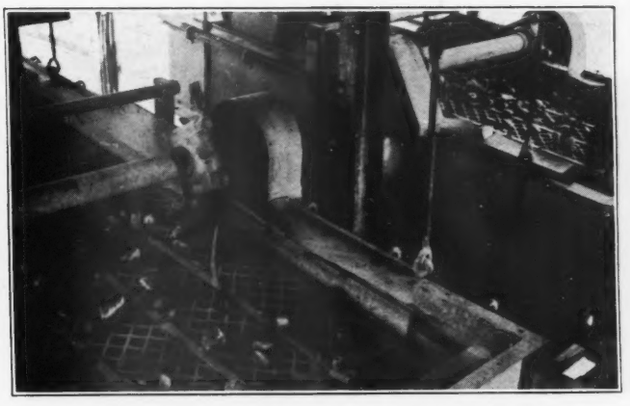
The shuttle conveyor rolling on car wheels is pushed into loading position by man power. The belt is operated by a 5-hp. electric motor. The same procedure is in effect for loading the cobbles at tower No. 1 as for gravel loading at the other towers, except that a steel hopper and movable spout are used in place of the shuttle conveyor.

The stock-piles are kept continuously wet by Binks spray-nozzles installed near the tops of the lowering ladders. The water filtering through the piles flows into a natural drainage channel north of the plant. The rock ladders that lower the aggregates from the conveyors are of structural steel with rails forming rock pockets for the rungs.

Water for the screening plant is supplied from Colorado River by 2 mi. of 12-in. pipe-line and 3 pumping stations to a sedimentation plant located on a hill 600-ft. southeast of the plant and finally by gravity through a 16-in. pipe-line to the plant distribution system. Colorado River water contains an average of 6,000 parts per 1,000,000 of silt, which is reduced by the clarification system at the sedimentation plant to fewer than 500 parts per 1,000,000 before it is supplied to the plant.

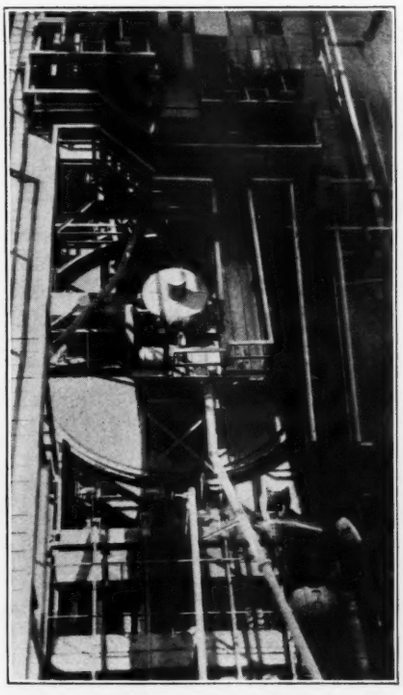
All supply-line pumping plants are equipped with three 4-in., 450-gal. per min. Byron-Jackson pumps, each operated by a 40-hp. Westinghouse motor. Due to the irregular height of the river water-surface, changing during floods as much as 15 to 20 ft. in as many hours, and on account of the drift floating in the river during floods, the intake plant is mounted on a car which runs on an inclined track and is raised and lowered by an electric hoist according to the fluctuations of the river flow. A 12-in.-diameter steel pipe, with 10-in. laterals at approximately 10-ft. intervals, is laid between the rails supporting the plant and connection is made to this line from the discharge side of the pumps.

The clarification of the water is effected by detention in a sedimentation basin for 2½ hr., precipitating approximately 98 per cent. of the suspended solids in this period. The 800,000-gal. sedimentation basin, 120 ft. in diameter and approximately 15 ft. high, is equipped with a 120-ft.-diameter Dorrco traction clarifier, which moves the solids to a sludge cone at the center of the tank, where the sludge is withdrawn at intervals by gravity action and is discharged to a natural drainage channel. Desilted water flows from the surface of the sedimentation tank through approximately 800 ft. of 16-in. line to the distribution system of the plant.



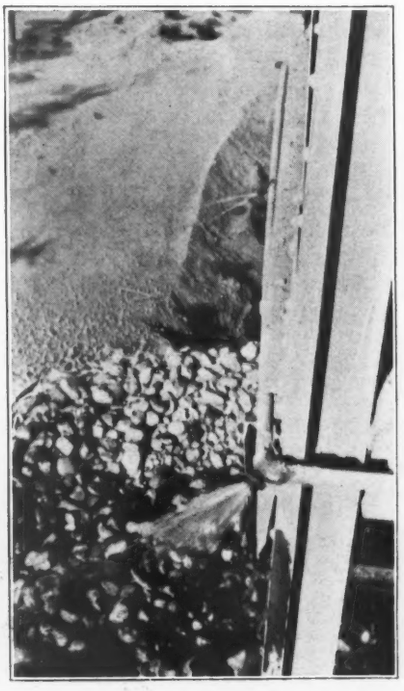
The two double-deck screens in tower No. 2.

Water is recovered at the plant from all washing operations except the sprinkling of the stock-piles. As described above, the overflow from classifier No. 3 is returned to the clarification plant by a 10-in. Cameron pump. The drainage water from the sand stock-pile and the waste-sand pile, and the wash-water from the loading hopper of tower No. 1 and the belts of towers 2, 3, and 4, are taken from a sump-tank by a Wilfley 6-in. centrifugal pump and lifted to a Bodinson classifier situated on a hill southeast of the plant. Here the sand is eliminated and the water passes to the recovery-line between the plant and the sedimentation tank, where it is



Looking down on classifiers, Nos. 1 and 2 at top and No. 3 at bottom.

Locomotive crane rehandling material from cars.



Type of spray nozzles used for sprinkling stock-piles at plant.

Group of officials concerned in the operation of the plant. Left to right: Mario; L. Eck; Higgins; Taylor; S. H. Wilde; Gunnel; T. M. Price; Allen; Dodge; H. Eck; Lane; Walker; Russell.

raised to the clarifier by the plant 10-in. Cameron pump and a 6-in. Byron-Jackson centrifugal pump located at the Bodinson classifier.

The plant is controlled from a central switching station located in the top of the scalping tower. Thirty-four sets of push-button switches electrically control all units of the plant, and one switch can stop all operations. At this same station the 9 gates in the bottom of the supply bin are regulated by rheostat control, thus governing the supply of aggregates to the primary conveyor and the output of the entire plant. There are four other push-button stations, each controlling the flow of gravel out of one of the four gravel stock-piles into the cars. One of these stations is located in each of the four towers at the outlets of the car-loading points.

All the conveyors are operated at a constant speed regulated from the gearing of the driving motors. The speeds of the conveyors throughout the plant vary from 150 to 350 ft. per min.

From an electrical standpoint the most interesting feature of the installation is the interlocking of the various belt and screen trains. This interlocking was designed to prevent the flow of material into any part of the equipment which has been stopped. Under normal conditions none of this equipment can again be started until all the final delivery belts are started, and the interlocking provides that the starting must be done in sequence. This feature prevents the piling up of material at any point and, consequently, prevents the clogging of screens, belts, etc.

In addition to the start and stop buttons in the master stations, duplicate push-buttons are provided at practically all the individual motors so that they can be stopped on the spot. Three-position control buttons are provided at the starters on the main board so that any motor can be removed from the chain-sequence operations and be operated independently. These buttons also provide a position for safety so that, if occasion demands, the push-buttons at the control stations and at the motors can be made inoperative. Three other control features are provided: (1) there is a fused disconnect switch ahead of each starter on the main board,

The aëroplane tripper distributing sand to stock-pile storage.

Railroad crane reclaiming sand from stock-pile storage.

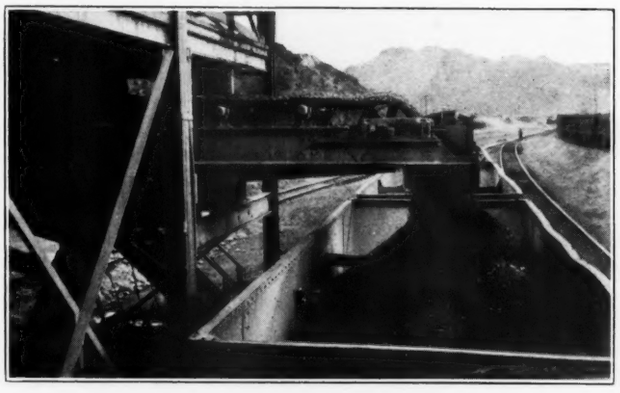
(2) each starter is provided with overload protection, and (3) there is an inclosed disconnect switch at each motor.

All the motors are 3-phase, 60-cycle, 440-v. machines. They are mounted outdoors and are exposed to the sun's heat and the sandstorms of summer and to the rain and snow of winter. There are 51 totally-inclosed self-ventilated squirrel-cage motors, varying in size from 5 to 150 hp., and one 100-hp. wound-rotor induction motor, with totally-inclosed collector rings, driving the cone crusher.

The electrical equipment is entirely of Westinghouse manufacture.

More than 385 tons of structural steel was used in the plant and the completed unit cost was over $450,000. The capacities, sizes, makes, types and other information concerning the equipment in the plant are contained in the accompanying tabular analysis of the operations and equipment.

It is contemplated that, when concreting operations are started for the main dam structure, the classification plant will be required to double its present capacity. All structural steel has been placed with this projected enlargement in mind, so



Loading pea gravel into hopper-bottom cars.

that the plant's capacity can be increased to 1,000 tons per hr. by replacing some conveyor motors, speeding up the conveyors, adding classifying screens and sand-classifiers, and lengthening the concrete tunnels under the stock-piles, the trestles leading to the stock-piles, and the conveyor belts running from the screens to the stock-pile and returning to the reclassification screens. An immediate change that is contemplated is the placing of tracks near the towers on the side of the stock-piles so that loading operations may proceed from either side of the towers.

The Six Companies, Inc., principal contractor for the building of Hoover Dam and power-plant, has as its president, W. A. Bechtel, with General Superintendent F. T. Crowe in charge of field construction. T. M. Price is superintendent of concrete-aggregates production and is assisted by an efficient force, including Assistant Superintendents William Fudge and Olaf Haugen, Master Mechanic H. H. Eck, and Chief Clerk S. H. Wilde.

The Bureau of Reclamation maintains close inspection of the material removed from the Arizona deposit and of the grading of the classified aggregates, correlating this work with the tests of specimens from concrete manufacture at the mixing plant and suggesting changes in the plant equipment in order to obtain the desired results. The lining of the diversion tunnels is now in progress and compressive strengths of concrete specimens are running from 3,100 to 4,200 lb. per sq. in. at 28-day age. Engineer O. G. Patch is in charge of concrete investigations, reporting to Construction Engineer Walter R. Young.

The Six Companies, Inc., is doing things in a big way in the construction of Hoover Dam. The building of the classification plant was one. The erection in Boulder City of a mess hall seating 1,300 persons, dormitories accommodating 1,500, residences 660 in number; moving nearly 1,500,000 cu.yd. of rock in little more than a year when driving four 56-ft.-diameter diversion tunnels for ¾ mi. through the walls of Black Canyon; constructing 20 mi. of railroad lines and a similar length of improved highways; building a concrete-mixing plant of a present capacity of 4,000 cu.yd. a day which will be enlarged to 6,000 cu.yd.—these are among the features completed by the contractor. The concrete-mixing plant will be described in a later article.

All the plant and transportation facilities and half the lengths of the tunnels will serve only a brief existence, but their value is of first importance in placing a barrier across Colorado River to control its floods and put its waters to work for the development of the Southwest.

Inspect New Cold Spring Plant of Hudson River Stone Corp.

The Hudson River Stone Corp., a subsidiary of O'Brien Bros., Inc., sand-and-gravel producers, on Wednesday, Oct. 12, conducted an inspection trip from New York City to its new crushed-stone plant, which is under construction at Cold Spring, N. Y. Invitations were sent to 260 contractors, material dealers, machinery manufacturers and others interested in the opening of the plant. Of these 225 attended and were taken from the Grand Central Station to the plant in a special train of six cars including four diners, a club car and a coach. Luncheon and refreshments were served on the train. Upon arrival at the plant the party was divided into groups which were conducted through the quarry and plant by the company officials and others in charge of the plant construction.

The plant is one of the largest and most modern ever built and will have a capacity of about 1,000 tons per hr. of sized commercial crushed stone when it is completed. All the plant buildings have been erected and most of the important machinery is already installed. Installation of electric wiring, transmissions, compressors, and other incidental equipment will be completed by Nov. 1 and the plant is expected to be in full operation by the first of the year. One of the interesting features of the plant is the power house, where three 660-hp. Diesel engines generate all the power required to operate the plant.

Program of National Safety Congress Attracts Interested Crowds

Accident-Frequency Rates Improve; Industrial Health Given Attention

AS in former years, the prevention of accidents to workers in industry was discussed in its many phases at the Twenty-First Annual Safety Congress of the National Safety Council held this year in Washington, D. C., Oct. 3 to 7. The Wardman Park and Shoreham Hotels housed the meetings of several thousands of the nation's safety representatives who assembled to secure inspiration and information that frequently are not available from any other source.

There were 123 sessions during the five days of the Congress, and these were addressed by 385 speakers, not counting the hundreds who participated in the impromptu discussions.

In his keynote address, delivered at the opening session, E. J. Mehren, president of the Portland Cement Assn., pointed out the various elements of good-will that accrue to any industrial establishment which undertakes accident-prevention work in an organized manner. It is generally agreed, he stated, that safety work pays dividends in dollars but, unfortunately, many executives overlook the good-will dividends that are secured when workers and management under proper leadership jointly assume responsibility for maintaining safe conditions in plants and quarries and for eliminating unsafe practices among the employees. Through this coöperative effort, "hands" or members on the pay-roll become men who think and who are respected because they think. From such a start the men become intelligently interested in personnel problems, discipline, relief, community service, education, and recreation. Good-will becomes evident in plant loyalty and better workmanship. The company is no longer *the* company, but becomes *our* company.

"This growing asset," continued Mr. Mehren, "can not be confined to plant limits. The men take it home to wives and children who are vitally interested in the safety of husbands and fathers. The workers, in learning to avoid accidents in plants and quarries, learn to safeguard the lives of their families and neighbors.

"As accidents dwindle, pauperism and the demands on charity decline, buying power increases, homes are better kept. Families rise to a higher scale of living. The story travels and the company acquires a good reputation. It has the pick of the workers. Local authorities take pride in the enterprise and help where they otherwise might hinder. Thus, the company reaps a great good-will dividend in the support it receives from its community."

In discussing the good-will of the general public, the speaker referred to the enviable safety record of the cement industry as a whole, the story of which has been broadcast in many ways. One of them has been through the wide publicity given to the dedication of safety trophies at cement plants which have gone through an entire year without a single lost-time accident. Governors, United States senators, congressmen, state commissioners, mayors, editors, and others have been generous in their praise of the association accomplishments, and that praise has become an asset in which the industry takes considerable pardonable pride. Public good-will has become at least a partial shield against the attacks and criticisms of the designing and uninformed.

In conclusion, however, Mr. Mehren sounded a note of warning that good-will must never be made the designed purpose of safety work. Instead, it must be a by-product of a sincere, honest effort directed primarily at the conservation of life and limb. If workers are influenced to see through the eyes of management, management must in turn see partially through the eyes of the workers. Then and then only will the company and the men jointly secure the financial and good-will dividends they have a right to expect.

Among the most serious and costly of industrial injuries are those to the eyes. This is a fact which was brought out at a joint session of the Cement and Quarry Sections by J. B. Zook, safety director, Great Lakes Portland Cement Corp., Buffalo, N. Y. His address appears almost in full elsewhere in this issue.

SOME of the reasons why the cement industry is the safest of all the leading industries of the United States were disclosed in a talk by E. Posselt, vice-president, International Cement Corp., New York, speaking on the subject *Safety from the Executive Viewpoint.* As one evidence of its desire to prevent accidents, his company in the year 1930 distributed nearly $42,000 among its employees as an incentive to still greater effort. He was not certain whether it is the humanitarian or the economical aspect of safety that is most influential in inducing managers to place their accident-prevention efforts on a well-organized basis, but he did express the opinion that every wide-awake executive looks upon safety as an important and integral part of his managerial duties. He feels that accident-prevention work, to be thoroughly successful, must be a mutual effort. On the one hand, the worker suffers actual pain when injured and his family and dependents must carry some of the economic consequences. On the other hand, however,

the executive can not fail to suffer heart-ache every time someone in his organization is injured, besides bearing his portion of the financial loss. It is plain, therefore, in his opinion, that the problem is of mutual interest and that results can only be secured through complete coöperation. Nevertheless, the executive must take the lead.

Executive leadership, of course, can not be provided without some expense, but all the money spent for safety is bound to be returned in cash plus interest. Management must remember this, he warned, when slashing overhead; otherwise, it may go so far as to stop the momentum already acquired through its safety effort and at the same time stop a profitable source of saving. In Mr. Posselt's opinion, the average American is very much "dollar-minded" and is easily interested in anything involving cash prizes. Thus, he feels that the money which his company has spent in awarding prizes for safety has secured quicker results than almost any other method which he might have tried. Once the workers become interested, they readily begin to understand something of the real meaning of the safety movement and their interest can be retained with or without cash awards. In support of this statement, he made reference to the inter-departmental safety contests, which he has inaugurated, whereby a cup and a small cash award are given to the department attaining the best accident record for the contest period. This contest, he explained, has created an *esprit de corps* within the plant and this is of marked value not only from an accident-prevention point of view, but from the production standpoint as well. Among other media for arousing and maintaining the interest of his workers in safety, Mr. Posselt mentioned the use of safety posters, the monthly news-letter of the Cement Section, and a small inexpensive "house organ" or workers' magazine.

IN a heart-to-heart talk on *In the Wake of the News,* Jack Dempster, of the Canada Cement Co., Ltd., Port Colborne, Ont., Can., contrasted the mental anguish of women and children who are widowed and orphaned by the accidental death of industrial workers, with the peaceful and undisturbed family relationships which exist in communities where local industries have gone for as long as 5 yr. without a single lost-time accident. He vividly pictured the appearance of a brief item in the local newspaper announcing the violent death of a fellow worker and then went on to depict the "back-of-the-scenes" tragedy in the home, knowledge of which never becomes "news." As contrasted with this side of the picture, Mr. Dempster then asked how many family circles have remained intact because thousands of industrial establishments have seen to it that workers' lives are not sacrificed in preventable accidents. He also pointed out the fact that the cement industry, as the safest industry in the United States, can look back upon a record not of "men we once knew who are now dead—but upon hundreds of homes that are happy because of the successful efforts of those whose business it is to make dust or to make little ones out of big ones." This record, he feels, places a responsibility upon every man in the industry to maintain its reputation and to make even better records in future years.

THE possibilities of controlling injuries and sickness among industrial workers through adequate industrial health service were discussed by Dr. C. O. Sappington, director, Division of Industrial Health, National Safety Council. He defined industrial health work as proper provision for the protection, conservation, and maintenance of mental and physical health for the industrially employed. In the minds of many people, making a physical examination of each prospective employee is all there is to it. The doctor explained, however, that it also includes a careful consideration of the previous occupational history and its bearing on the mental and physical status of the applicant; periodic re-examinations; proper placement of the worker where his defects will be minimized in their possibilities of causing trouble to himself and to others; and advisory service leading not only to the correction of physical defects, but also to the smoothing out of psychologic and psychiatric difficulties which may arise in the relationship between the worker and his superiors, his fellow workers, and his family. Furthermore, industrial health work includes a study of occupational poisons and diseases; ventilation; illumination; and sanitation; as well as participation in the health work of the community.

He dwelt for some time upon the similarity of the general objectives of safety and health work, but in his opinion, the methods used to accomplish results are so different that the administration responsibilities of these two activities must be placed in the hands of two separate authorities, one a safety man in charge of accident prevention, and the other an industrial physician in charge of health work. Rarely is one man found who can assume responsibility for the administration of both. On the one hand, engineers do not know enough about the human body and medicine to undertake this joint authority; and on the other hand, physicians do not understand fully the engineering aspects of industrial illness and injury. The best results are obtained, he feels, when these two men work in close harmony, each appreciating the help which the other can give him. To illustrate this statement, Dr. Sappington recalled that the causes of many accidents are inexperience, improper training, physical defects, financial, home or personal worries, improper attitude resulting from poor industrial relations or poor adjustment to social conditions. In practically every one of these causes, he pointed out, there is a problem of either physical or mental health which can be solved only with the help of someone trained in both phases of industrial medicine.

It has been difficult to measure the tangible results accruing from the application of the principles of industrial health work. Nevertheless, he cited the experience a concern whose management instituted an industrial-health program about two years ago. In the first year, the sickness-frequency rate dropped from 438.9 cases per 1,000,000 man-

hr. worked to 78.6. The accident-frequency rate likewise dropped from 11.3 accidents per 1,000,000 man-hr. worked to 6.4. He also quoted from a publication of the National Metal Trades Assn. in which it was reported that a special group of fifteen companies, through their industrial health departments, experienced a decrease of 50.6 per cent. in their absenteeism due to all types of disability, including sickness and accidents.

In his opinion, many managers are deterred from organizing industrial health departments because they mistakenly believe the cost would be unjustifiably high. He explained, however, that the cost of medical service per employee usually ranges from about $10 in smaller organizations to approximately $3 in larger ones, and that the average is not far from $7. If the general consensus is correct, namely, that every industrial worker on an average loses 7 days per year because of illness, and that $4 a day is the average wage, then it is readily seen that the manager who spends $7 per yr. per worker for health service does this with the possibility of saving a good percentage of $28 per yr. per worker.

IN an address, *Safety in Limestone Mining and Quarrying,* Dan Harrington, chief engineer, Safety Division, U. S. Bureau of Mines, Washington, deplored the fact that quarrying as an industry has not had a good accident record. Notwithstanding the progress that has been made in recent years by individual quarrying companies, the latest figures released by the National Safety Council indicate that quarrying is ranked No. 21 among 28 important industries in accident frequency and No. 27 among 28 in accident severity.

According to reports of the bureau, approximately 80,000 persons in the United States are employed in and around quarrying operations of various types, including cement rock, limestone, marble, granite, sandstone, blue stone, trap rock, and slate. In this limited group limestone quarrying has a fatality rate that is higher than the average for the industry—and the rate of those injured per 1,000 workers is likewise higher than the average for the industry. It is significant that both these rates for cement-rock quarrying are much below the average of the whole quarrying industry and this points definitely to the fact that the other types of quarries can learn much in safety by studying the methods of the cement industry. The cement industry, Mr. Harrington pointed out, is lighting the path to maximum accident reduction in quarries just as it is performing a similar function among nearly all the main so-called hazardous industries of the United States.

That quarrying is hazardous is admitted by all persons even remotely familiar with the work. Yet reasonably safe operation of quarries can be accomplished, as is evidenced by the numerous individual quarry companies which have operated for long periods, not only without fatalities but also without the occurrence of any injury which would cause the victim to lose time from work. By way of illustration he cited the experience of the 1931 national safety competition sponsored in part by the U. S. Bureau of Mines, wherein 76 companies (practically 22 per cent.) of the 349 quarries and open-cut mines which participated, operated through the year without a single lost-time accident. The man-hours of exposure of these no-lost-time accident operations varied from a minimum of 10,010 to a maximum of 339,722.

He contended that both large producers and small producers are able to operate safely. In fact, it appears that from 60 to 75 per cent. of all quarries have safety records better than the average of the industry and that a relatively few backward organizations continue to give themselves as well as the industry as a whole, a "black eye" as far as accident prevention is concerned. As Mr. Harrington expressed it, if every quarry executive realized that accidents frequently add 10 per cent. to the total cost of operating their mines and quarries, they would immediately apply the readily available precautions that have already been adopted by half of the rock-producing plants, and the unsavory accident record of the past and even of the present would soon disappear.

In general, he pointed out, the hazards encountered in underground limestone mining come largely from defective ventilation; poor illumination; the misuse of internal-combustion engines underground; carelessness in storing, handling and firing explosives; and the dangers from underground haulage. Another hazard which is practically universal, but the existence of which is frequently denied, is that of mine fires. The speaker agreed that there is very little material in a mine of a combustible nature, but any fire, even though small, through the quantity of poisonous gases which may be given off can quickly cut off exits for numerous victims.

When organizing a quarry or mine for accident-prevention work, Mr. Harrington held that the factor of primary importance is a recognition by the higher officials that accidents are a waste not only of human life and limb but also of money and are likely to destroy dividends. If those higher up realize these facts and make a personal effort to see that safety becomes an integral part of the operating policy, the battle then is at least half gained. Other factors enumerated by the speaker included honest investigation of all accidents, the careful maintenance of accident records, holding safety meetings, preëmployment physical examinations, reëxaminations, first-aid training of all employees, the organization of safety contests, and the safeguarding of machinery and all other hazards where possible.

IN recommending that quarry executives should take an active interest in the safety work of their communities, H. D. Immel, former director, Bureau of Inspection, Pennsylvania Department of Labor and Industry, Harrisburg, Pa., stated that the affairs of industries and of the communities in which they are located are so interrelated that whatever affects one adversely is bound to affect the other in the same way. An accident sustained by an indus-

trial worker adds to the cost of production, reduces the profits of the industry, and the prosperity of the community. As compensation insurance replaces only a small percentage of the wage loss, the purchasing power of the injured worker is reduced; not infrequently he and his family become public charges. On the other hand, accidental injuries which occur outside industry—and these he finds to be more than 80 per cent. of the total accident toll—cost the community infinitely more. Usually the injured person has made no provision for himself or for his family against such an eventuality, and a heavier burden thus falls upon the community.

Because of industry's big stake in accident-prevention work, he contended that industrial executives must take the initiative in all efforts that are made to organize safety work on a community basis. Industrial leaders are familiar with the machinery of safety and usually they are men of such prominence in their communities that they are in the best position to tie together the various groups and individuals essential to the success of the program. In suggesting the methods which might be followed, Mr. Immel outlined the procedure which had been adopted by the Pennsylvania Department of Labor and Industry in helping to organize four new safety councils and to assist the three thriving councils already in existence within his state. He particularly dwelt upon the experience of the community safety council in York, where John E. Baker, of the J. E. Baker Co. (a quarrying concern), became convinced that something could and should be done about the accident record, not only of his plant but of the community as a whole. Mr. Baker went to work so effectively, Mr. Immel said, that in his first year of organized safety work, he achieved a saving of more than $30,000 for his company. He also succeeded in interesting the local chamber of commerce, the manufacturers' association, and the foremen's club, through whose coöperation the York County Safety Council was organized. From the start this body undertook activities in three important fields, those of public safety, industrial safety, and school safety. The local superintendent of schools headed the committee on school safety; the foremen's club quite logically undertook responsibility for industrial safety; and the local manager of the public-utility controlling trolley and 'bus transportation was secured to direct the public-safety work.

One of the greatest of all needs for the furtherance of safety work in communities, Mr. Immel said, is the preparation of intelligent statistical information concerning accidents. Last year the Pennsylvania Department of Labor and Industry undertook the task of collecting data on all accidental fatalities in Pennsylvania communities of 10,000 population or more. It has been found that publicity given to these data has aroused considerable interest and has inspired friendly competition to reduce accidents.

INASMUCH as figures for 1931 are not yet available, W. W. Adams, chief statistician, Demographical Division, U. S. Bureau of Mines, Washington, analyzed the record for the 9-yr. period of 1922-30 in tracing the trend of progress of safety in the quarry industry. A study of this record, he said, indicates there were 174 injury cases per 1,000 workers in 1922 as compared with 110 injury cases per 1,000 workers employed in 1930. This represents a reduction of 35 per cent. in the accident-frequency rate during 9 yr., or nearly 4 per cent. a year. This downward trend of 35 per cent. was the net result of a reduction of 10 per cent. for quarry operations and 56 per cent. for operations outside the quarries. In comparing various types of quarries, credit must be given the marble quarries for making the most progress in accident prevention since 1926. In that period the accident-frequency rate for marble quarries declined 29 per cent. Cement quarries ranked second, limestone quarries third, granite quarries fourth, trap-rock quarries fifth, sandstone sixth, and slate quarries seventh, with a 2-per cent. reduction.

Although stone of some kind is produced in nearly all parts of the country, twelve states account for more than 50 per cent. of the men employed. When considering the progress made by these twelve states in preventing inside-the-quarry accidents, Illinois was found to have made the greatest improvement. The downward trend of the accident-frequency rate in this state has averaged about 6 per cent. a year in 9 yr. New York is second, with an average yearly reduction of 4 per cent. Indiana is third, with an annual reduction of 2 per cent. Then come Pennsylvania, Tennessee, Massachusetts and Ohio in fourth, fifth, sixth and seventh places with slight reductions. The 9-yr. trends in the remaining five states of Missouri, West Virginia, Vermont, California, and Virginia are upward. Mr. Adams then explained that he had studied the records of all crushed-stone plants versus those of dimension-stone plants and found that the crushed-stone plants had not only made a greater percentage reduction in their accident rates but had also attained lower rates than the dimension-stone plants. In his opinion, much of the marked progress made by the crushed-stone plants is due to the accident-prevention programs fostered by the Portland Cement Assn. and the National Crushed Stone Assn.

The speaker also announced the following changes in the rates of accidents resulting from each of the six most important accident causes during the past 9 yr.:

	Changes in Accident Rates	
Accident Causes	Dimension-Stone Quarries	Crushed-Stone Quarries
Falls or slides of rock	+ 91%	— 12%
Handling objects	+ 85%	— 5%
Haulage	— 28%	— 24%
Falls of persons	+ 42%	+ 8%
Falling objects	+ 4%	— 30%
Flying objects	— 7%	— 33%

Several years ago it was uncommon for any quarry to operate for an entire year without a lost-time accident. Now, however, the number of such companies is growing each year. Excellent as these 1-yr. records are, several companies have now been

able to operate for 5 yr. without any lost-time accidents. Such records have been attained by Quarry No. 4 at Nazareth, Pa., of the Penn-Dixie Cement Corp.; the Omrod, Pa., Iola, Kan., and the Sandt's Eddy, Pa., quarries of the Lehigh Portland Cement Co.; the Mildred, Kan., quarry of the Consolidated Cement Corp.; and the Ironton, O., underground limestone mine of the Alpha Portland Cement Corp.

Two series of slides—90 in all—were presented and discussed; one set by M. F. Leopold, safety engineer, U. S. Bureau of Mines, Washington, and the other by A. R. Couchman, safety director, North American Cement Corp., Martinsburg, W. Va. These slides illustrated facilities for rendering first aid, safe methods of storing conveyor screws when not in use, typical warning signs, safe electrical installations, safe and unsafe drilling methods, pit car haulage, crushing equipment, and blasting.

NUMEROUS safety factors that can be built into the highway were outlined by Maxwell N. Halsey, Traffic Engineer, National Bureau of Casualty and Surety Underwriters, New York, who felt that cement-company salesmen should familiarize themselves with these factors so they can advise county boards and others who are considering the purchase of materials for new highways. Purchasers, he said, are usually uninformed about the advantages of one material over another and also about the recent improvements which have been made in highway design and construction. Those salesmen who are up-to-date in these phases of their work are much more likely to make sales than mere order-takers.

Among the safety factors which he mentioned as worthy of careful consideration and which he illustrated with slides were road crown, banking at curves, grade separation, pedestrian islands, road illumination, proper use of color in the cement mix, smooth vs. rough surface, width of roads, and traffic signs, signals and lights.

For instance, he explained that in constructing a 3-lane highway, the two outside lanes should be made of smooth white cement, but the center lane should have a slightly rougher and darker finish. This will discourage drivers from using the center lane except when passing other cars, and thus it will decrease the number of head-on collisions.

As another example he explained how proper pedestrian islands not only give the pedestrian "a break" but also eliminate dead space on the road, thus making it impossible for the driver to wander about; his movements become more regular and, so far as possible, the motor car is placed "on rails."

It is unfortunate, he said, that many persons consider the newer roads more unsafe than the older roads. This belief is not true, according to Mr. Halsey, but cement men must join with traffic and highway engineers in securing the adoption of sound engineering principles in building efficient minimum-cost roads which are safe from an operating point of view.

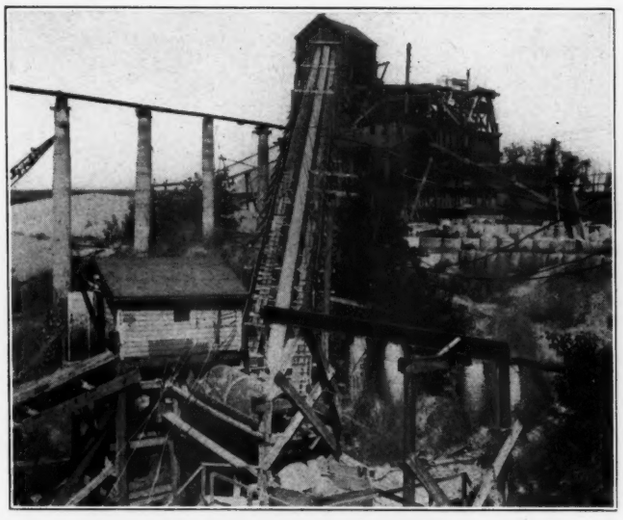
IN telling how the Berkley plant of the North American Cement Corp. won the 1931 National Crushed Stone Assn. safety contest, M. V. Miller, vice-chairman of the plant safety committee, stated that the workers in this plant have operated for 1,300 days without a single lost-time accident and that they are still going strong. All foremen are members of the safety committee, of which a new chairman is elected each month. Committee meetings are held monthly, in addition to which there is a safety rally of all workers held once each month and at which the chairman of the safety committee presides. Mr. Miller also discussed the plan whereby all new employees are given physical examinations before they are assigned to duty.

THE Van Sciver (Morrisville, Pa.) plant of the Warner Co., winner of the 1931 safety contest of the National Sand & Gravel Assn., was represented by Ralph Dinsmore, personnel manager, who stated that the Van Sciver plant had a perfect record for the entire year of 1931, as well as for the year 1932 to date. The seven activities which have made this record possible were outlined as follows: (1) All plant properties are safeguarded to the best of their ability; (2) the engineering department does everything in its power to build safety into all new machines and equipment and to make all possible improvements in old machines and equipment; (3) all accident records are analyzed to spot the worst departments; (4) a safety committee was organized to make regular inspections and to investigate all accidents; (5) the company started to print monthly editions of a foremen's bulletin, copies of which are distributed to all foremen and company executives; (6) an interdepartmental contest was organized, the prize going to the winning foreman being a free 3-day trip to Philadelphia; (7) all applicants for positions are given physical examinations before employment.

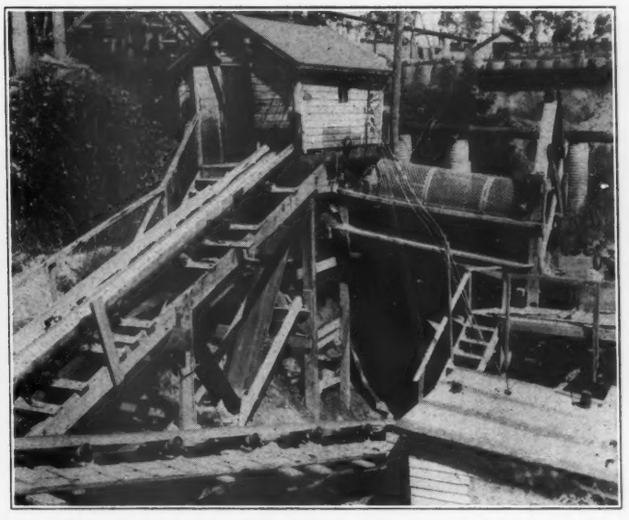
Because of these activities, accidents in all Warner Co. operations have been decreased from 161 in 1930 to 101 in 1931, and then to 39 in the first 9 mo. in 1932. Similarly, compensation costs and hospital fees have been decreased from $24,000 in 1929 to $19,000 in 1930 and to 12,000 in 1931.

W. W. HAMILTON, of the Alpha Portland Cement Co., Easton, Pa., drew attention to the fact that many companies have succeeded so well in reducing accidents to their plant employees that they have recently undertaken the prevention of highway accidents among their employees who drive company cars. In his company, all such drivers have been divided into groups and an intergroup safety contest has been organized. In his opinion, lack of road courtesy is responsible for more accidents than any other one factor, so in accordance with this thought each driver has pledged himself to show road courtesy to all pedestrians and other drivers and to do everything in his power to prevent traffic accidents. At the close of each contest, not only is a prize awarded to the winning group, but a certificate of merit is also given to all drivers who operate for one year without an accident. He went on to recommend the organization of a safe drivers' league, at least among cement companies. If such

(Continued on page 40)



General view of plant showing crushing and scalping equipment and main conveyor in foreground.



Close-up showing conveyor from pit at left, scalping screen and crusher at right and return conveyor in foreground.

Installs Portable Scalping Unit at Pit to Waste Excess Sand Cheaply

Equipment Maker Helps Operator Solve Problem of Wasting Surplus Material

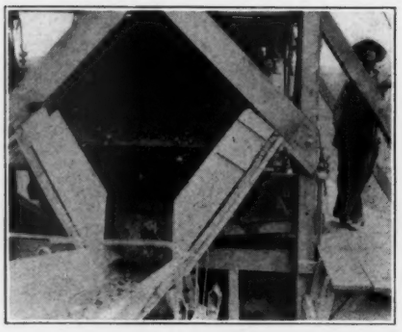
THE Concrete Materials Corp., of Waterloo, Ia., has always been known for its progressiveness and willingness to pioneer new methods of achieving greater economy of operation and securing a higher quality of product. One instance of this is the system recently installed by the company at its Humboldt, Ia., plant to dispose of excess sand at the pit. The deposit contains a high percentage of sand which is not readily marketable and some means had to be found to dispose of most of it at the pit in order that the plant might be able to operate at a profit with the low prices prevailing. This sand had been repumped to a waste-pond but this was becoming full and made disposal a problem. The Link-Belt Co. was called into consultation and a method decided upon. The portable sand-scalping unit described below was installed late in June, 1932, and has solved the problem.

The plant is located about 3 mi. south of Humboldt, Ia. The property near the plant has been worked out and operations are now being conducted about ¼ mi. east of the plant. The overburden, which averages about 2 ft. in depth, is cast back into the pit by the drag-line used for excavating the sand and gravel. The deposit averages 25 ft. in depth, with the water-level 25 ft. below the surface, and averages about 15 per cent. gravel. Of the gravel about 5 per cent. is over 1½ in. in size and must be crushed. Some clay is present in the deposit.

A Link-Belt electric drag-line, handling a 1½-cu. yd. Page bucket, excavates the material and unloads it in the sand-scalping unit which is mounted on two regular railroad flat cars. The drag-line discharges into a 4½-cu. yd. steel hopper placed on one of these cars. A 36-in. Link-Belt belt-feeder carries the material to a 24-in. belt-conveyor which operates on 48-ft. centers and discharges into a small timber hopper on the second car, which is coupled 10-ft. from the first. This feeds directly to a 24-in. belt-conveyor which is set on 32-ft. centers, and discharges to a spreader chute feeding a 6-ft. by 8-ft. Niagara double-deck vibrating screen. The upper deck has two panels, one with ½-in. square meshes and the other with ½-in. by 2-in. slotted-mesh wire cloth. The lower deck has ¼-in. by 1-in. slotted-mesh cloth. National wire cloth is used on this screen.

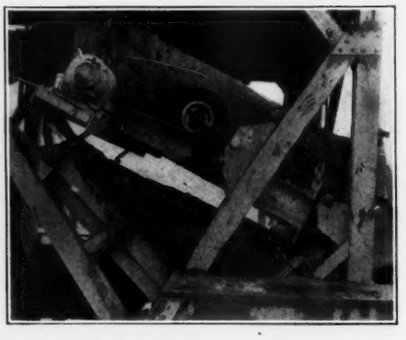
The material passing through the bottom deck is sand and is fed through a chute to a 24-in. by 42-ft. horizontal belt-conveyor, which is set at right angles to the car and casts the material back into the worked-out section of the pit, out of the way of the drag-line operation. The two sizes of material retained on the screen decks are fed through the same chute to a 24-in. by 42-ft. inclined loading conveyor which discharges through a swinging chute into a car for haulage to the plant.

Originally the scalping unit was on one flat car but, as it was found that the depth of operation caused the overcast material to flow back into the way of the drag-line bucket, it was decided to mount the hopper and the additional conveyor on a second car. This method of separating the operations has proved satisfactory. Another change made necessary was the conversion of the scalping operation from dry to wet screening. The material coming from the pit was moist enough to be sticky and could not be screened effectively, so it was decided to screen it wet. A 4-in. line of Taylor spiral pipe was



View showing vibrating screen discharging to loading belt conveyor.

Edsall Rust, bookkeeper, left; George H. Rust, superintendent, right.



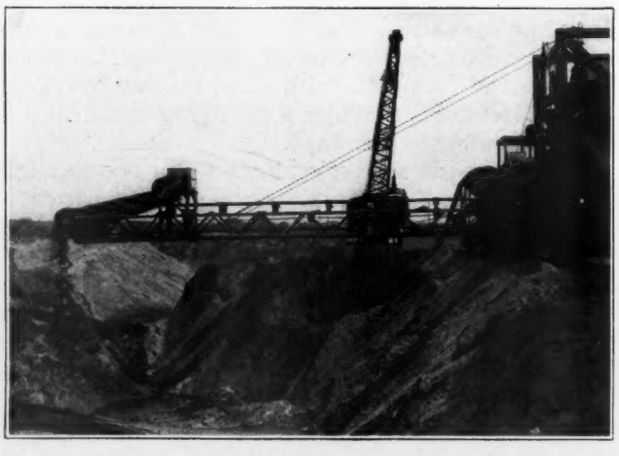
Side view of vibrating screen on sand scrubber showing V-belt drive.

tapped into the main plant pipe-line and is connected to the scalper by 100 ft. of heavy rubber hose. Washing is done in the usual manner with spray pipes on the vibrating screen. Electric current is supplied through a Rome Cable & Wire Co. insulated cable at 440 v. from a transformer which is near the pit and reduces the voltage from 6,600. A similar cable supplies current to the drag-line and another to an electric locomotive-crane at the plant.

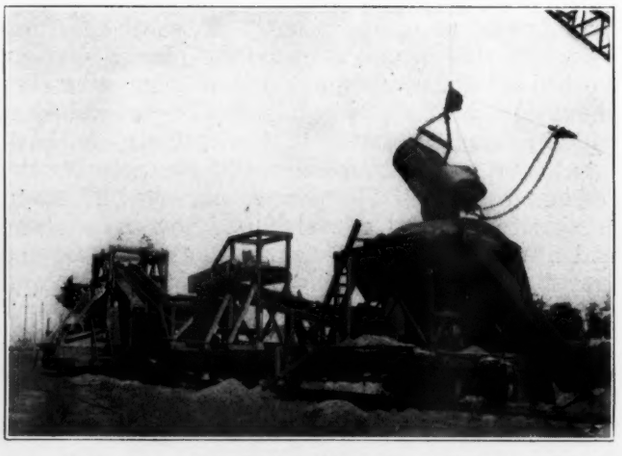
The scalping unit is of bolted-timber construction with the exception of the steel hopper and the steel lattice booms which support the overcasting and loading conveyors. These are supported by cables from the main structure. A ballast box loaded with sand is used to counterbalance the weight of the sand conveyor. Each of the two inclined conveyors is driven by a 7½-hp. General Electric motor, the sand conveyor by a 5-hp. motor, and the loading conveyor by a 7½-hp. motor. All these units are driven through Link-Belt silent-chain and roller-chain drives and all the motors are inclosed by ventilated galvanized-metal housings. The feeder is chain-driven from the tail-pulley of the first conveyor. The vibrating screen is driven through Cog-Belt by a 5-hp. Continental motor. All the electrical equipment on the scalper was furnished by the General Electric Co. All the equipment is controlled by push-buttons at a central station. Cincinnati conveyor belting is used on the first conveyor and Goodyear belting on the other three conveyors. Link-Belt conveyor idlers are employed. The sprays used for washing the material are of a special type provided with interchangeable bushings to control the water flow and a large-sized opening which makes clogging of the spray, due to sediment in the water, impossible. These sprays were invented by W. F. Slaughter, the agent for Niagara screens at Stillwater, Minn. One is used where the belt-conveyor discharges on the screen and eight on the lower deck of the screen.

When sand is required at the plant the scalper is run out of the way and material is loaded directly from the pit into cars for shipment to the plant. The scalper or the drag-line, as the case may be, loads a 25-cu. yd. bottom-dump steel ore car which is hauled to the plant by a 12-ton Plymouth gasoline locomotive. The car unloads at the plant into a 2-car capacity track-hopper. A feeder discharges the material to a 24-in. belt-conveyor which runs on 75-ft. centers and feeds a 24-in.-diameter revolving scalping screen having 1½-in. openings. The oversize goes to a No. 5 Austin gyratory crusher which discharges to an 18-in. belt-conveyor operating on 55-ft. centers. This feeds the material back to the first belt-conveyor leading from the track hopper. The material passing through the scalping screen goes to a 24-in. belt-conveyor which is set on 212-ft. centers and feeds a 4-ft. by 8-ft. Niagara double-deck vibrating screen at the top of the plant. This has ¾-in. and ¼-in. National wire cloth on the top and bottom decks respectively.

The material retained on the upper deck is washed in an Eagle single-screw washer and is then passed over a picking table before being sent to storage.

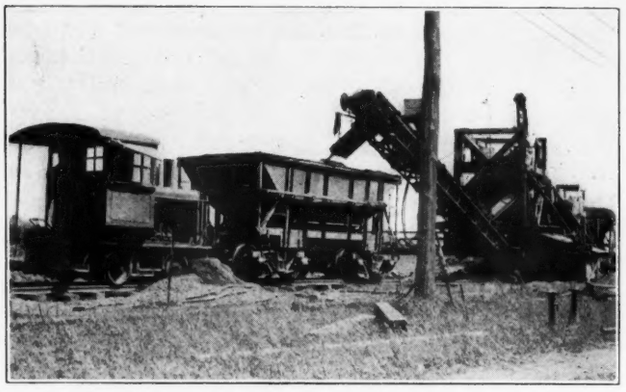


View showing manner in which waste sand is overcast into pit. Drag-line excavating in background.



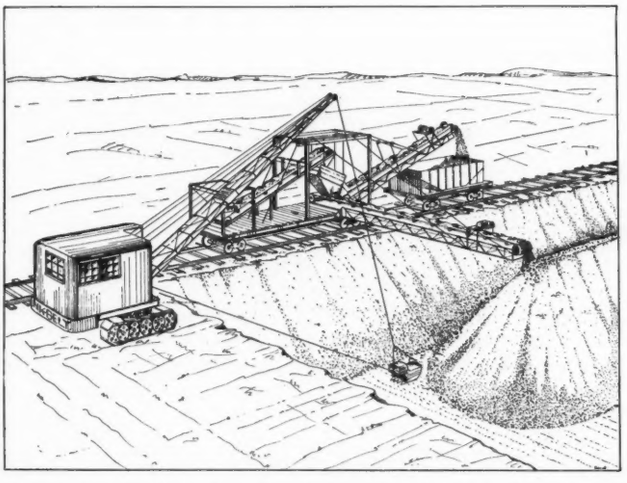
View of the sand-scalping unit which clearly illustrates the method of operation. Note ballast box at left.

The material retained on the lower deck goes through a split chute to 2 Eagle washers which also supply the storage. This material can also be diverted through a pipe to a stock-pile, or it can be added to the paving gravel in an adjacent bin, or it can be diverted to another stock-pile for use in the adjacent pipe plant. The material passing through the lower deck of this screen is chuted to 2 Link-Belt Dull 6-ft. sand-cones which produce concrete



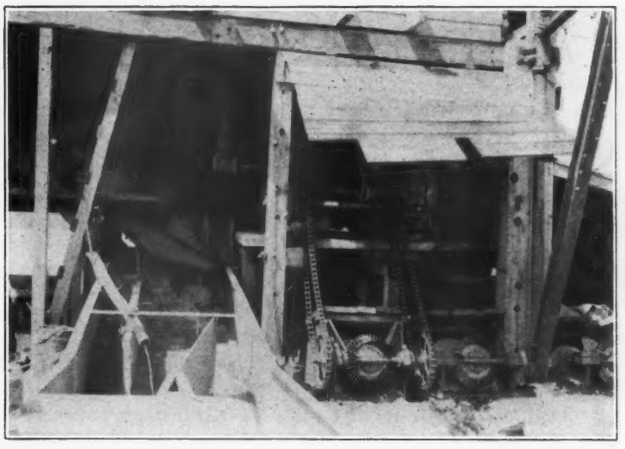
The sand-scalping unit loading car for haulage to main plant.

sand, the overflow from the cones being flumed to an underground sewer which discharges it into the river near. This system is used when sand is desired and the sand scalper is not used. When the scalper is in operation, gates under the chutes feeding the sand-cones divert any sand passing the scalper to a flume which feeds a 6-in. Amsco centrifugal pump. This rehandles the sand to the waste-pond near the plant. When there is a demand for plaster sand,



Perspective sketch of sand-scalping unit showing the original arrangement before extra car and conveyor were added.

which is very seldom, concrete sand is rehandled from the stock-piles and run through the entire plant. When this is done ⅛-in. screen cloth is used on the bottom deck of the vibrating screen. A Link-Belt electric locomotive-crane, with a 1½-cu. yd. Williams clam-shell bucket, rehandles the material from the stock-piles into a car, which then unloads it into the plant hopper. As the sand stock-piles in any case require an occasional cleaning up, this method of making plaster sand is not as expensive as it might seem. This crane is one of the first elec-



Three screw washers and vibrating screen in the main plant.

tric-driven units built by the Link-Belt Co.

The plant was built about 20 yr. ago and has been added to and rebuilt from time to time. At present it has a capacity of about 50 tons of gravel per hr. If all the sand could be marketed, it would have a capacity of about 225 tons per hr. The plant was taken over by the present owners two years ago. It was formerly owned by the Humboldt Gravel & Tile Co., which also owned the pipe-and-tile plant alongside. This is now owned by the Wilson Concrete Co. which buys its aggregates from the gravel company.

The gravel plant is on the Minneapolis & St. Louis Ry. over which most of the shipments are made. Most of the product is used for highway work. Car shipments are weighed on a Howe 160,000-lb. track-scale. The company operates a complete machine-shop in which most of the plant repairs are made. The equipment includes a portable General Electric arc-welding set which is mounted on a trailer.

The main office of the Concrete Materials Corp. is at 504 Lafayette Bldg., Waterloo, Ia. The firm's officers are: H. D. Bellamy, president; T. E. Rust, vice-president and general manager; and C. E. Oldham, secretary and treasurer. Geo. H. Rust is superintendent of the Humboldt plant. The company operates three other gravel plants, at Eddyville, Gilbertville and Wallingford, Ia., and a crushed-stone plant at Bethany, Mo.

Drag-line excavating from pit with conveyor which overcasts sand to pit in background.

Problems and Policies of the Lime Industry*

By CHARLES WARNER
President, the Warner Co.

I THINK the National Lime Assn. has a clearer conception of its duties and functions than ever before. I can speak with some authority when I say this, since some of the experiences during the time of my active association efforts clearly showed that policies and methods successfully applied in other associations were not workable in the lime association. Unlike other materials which have well-defined specification standards, such as Portland cement, steel, etc., lime is, generally speaking, entirely lacking in standards. Limestone and lime vary widely, both physically and chemically, in different sections of the country, and, in addition, it has been largely impossible to apply any standards in the burning of lime that will insure in advance a product of a given specification. The same stone reacts differently under different methods of burning. So, too, the same method of burning reacts differently with different characteristics of stone.

Under such conditions it has become apparent that a national association can not be of much use in specific or practical research work as applied to the lime industry, although there are doubtless certain broad fields of basic or pure research that might be of some value to follow. Results of practical or commercial value from national research are uncertain. If definite lines of pure science could be followed for a long term backed up by adequate capital, we might get somewhere; but it has been demonstrated to be impractical for our national association, with its always unpredictable future and the varying moods of its supporters, to follow through on such work.

In many ways lime is a local proposition. Prevailing low prices still further localize the market of each plant. It is natural, therefore, that there exist all over the country local conditions concerning the marketing of lime that differ materially. As a result, what may be good practices and methods for lime manufacturers in one locality may be entirely unsuitable in another. The policies of the association, therefore, must be broad enough to leave to each district its own problems for solution, and confine its efforts to advising and guiding, in so far so possible, the district policies, in order that there may be a minimum of conflict between districts and with national policies. There is certainly important work for our national body in handling many problems where districts overlap and conflict in sales and promotional work.

As an example of district effort, it is interesting to note that the total consumption of all agricultural liming materials for the year 1931 was 2,550,000 tons. Of this amount, 310,000 tons, or 12 per cent., was burned or hydrated lime. In the mid-atlantic states, where the Quality Lime Institute is doing promotional work, 67 per cent. of the burned lime was sold, while only 10 per cent. of the total of ground limestone, marl, etc., was used. Or, in this district, of a total of 493,000 tons of liming material, 42 per cent. was burned or hydrated lime, as compared with 12 per cent. for the country.

The same arguments can be used, in so far as research into the various uses for lime is concerned, but in a more general way. A lime inferior in chemical and physical analyses may be better suited for a certain industrial use than a lime that is superior, chemically and physically. The relative values of magnesium and high-calcium lime is an old story to us all. It is clearly obvious, therefore, that, to unify the support of the lime association by all lime manufacturers in order that it might promote the general use of lime, as such, and defend it against attacks from competing industries, extreme care must be taken to deal with all subjects in very general terms, lest, unwittingly, the interests of some manufacturers may suffer.

This is what my years of experience have taught me, and is the reason why I advocated, and heartily supported, the association's set-up and budget, as proposed three years ago, as being not only the desirable budget, but the ultimate to be desired under the conditions now existing. That budget proposed a staff substantially as has existed for the past two years, and which I believe is the minimum that can give the service and attention to matters vital to the industry demanded of it by consumer and manufacturer. It also provided for a moderate amount of national advertising, which is certainly desirable, when funds are available, to support and back up the personal activity of the association staff. I feel that those who have not been actively identified with the association work do not fully appreciate the many opportunities it has to render service for lime in a quiet and almost routine manner, in thousands of cases that would never be brought to the attention of the lime industry were it not for the national Association.

Beyond the direct work of promoting the use of lime and defending the industry from attacks of competing industries, lies another broad field of work which the association must assume as one of its major responsibilities. In these times more than ever before, the industry must be unified, if it is to defend itself successfully against two evils: (1) Self-destruction by reason of unfair and ignorant competition within the industry, and (2) destruction from without by organized competition, fair or unfair.

* Presented at the 14th Annual Convention, National Lime Assn.

Three years ago, under the auspices of the Federal Trade Commission, the lime industry held a Trade-Practice Conference in Washington, and adopted certain rules of fair practices for its guidance. Unfortunately, it has since been found that there were no teeth in the Federal Trade Commission Act providing for the enforcement of the rules adopted. There is, however, much agitation for real enforcement provisions, and several bills in this session of Congress provide for such. While it is improbable that any action will be taken in this session, I am very hopeful for the future.

It does seem to me, however, that since that conference, partially as a result of it, partially as a result of the business conditions of the past three years, and partially due to the good work that Mr. Hough has been doing, there is a growing sense of industry responsibility on the part of manufacturers. There seems to be a greater realization of the necessity for coöperation between manufacturers, particularly as to fair and decent marketing practices and a recognition of the rights of the other fellow. It has become more and more apparent that we shall all swim together or sink together. There is more of a tendency to view a situation through the other fellow's eyes as well as our own, and to realize that what may be good for us may be bad for him, in which case there is a compromise ground that must be found and can only be found by frank, honest coöperation to learn the facts and ultimately arrive at the solution that is best in the long pull for all concerned.

We are in the midst, and, I hope, at the bottom of the most severe business depression that any of us has probably ever experienced. What is this experience going to do to help us to better practices, better conditions, and sounder profits, as we gradually come out of the depression and land in a new level of costs, of sales prices, and of profit-making possibilities?

These are days when we must not worry ourselves too continuously with the problems of the moment, but must try to throw our ideas and planning into the future. In fact, this is the only mental policy that can give us any relief and encouragement. I urge, therefore, each of you to utilize your present moments so far as possible in considering safe and sane methods for improving your particular situation and placing it on a sounder basis so that your investment in experience and in capital in the lime industry may honestly yield you the utmost that the future can offer.

There can hardy be a section of this country that has not experienced radical changes in production and marketing situations. These changes provide opportunities for the forward-thinking men of the industry to make, either by purchases or by mergers, alignments which will strengthen their future asset value both as to their earning power as officials and as to their returns on capital invested in our industry. I know of many spots over the country where, if the various competitors would sanely reconcile themselves to present-day depreciated values brought about by more or less permanent competitive conditions, and would arrange for purchases and sales, or mergers, in line with present-day values so that they may be soundly capitalized for the future, very substantial economies in production and sales would result. Both the buyer and the seller or the parties merging should be able to work out sane business deals if they start on sound fundamental values as a basis, and should be able to profit much more fully in the future than by continuing unsound competitive practices and the partial operation of too many high-cost plants.

The fewer companies we have in the lime manufacturing business consistent with the legal restrictions, the more safely will the industry be managed in all respects and the more money will be thrown into sound local research and improvement practices to help bolster the industry as a whole. If I can leave you a message to-day which I feel is of more importance than any other, it is to urge you to seek most earnestly to utilize the present opportunities to bring about fundamental changes in control and management of the various competitive enterprises in your local districts, so that lasting economies in both production and marketing practices may be accomplished and so that more funds may be available out of these sounder earnings for the future promotion of the lime industry.

Protect Rubber Belting in Periods of Inactivity, Maker Urges

During the present period many industrial plants are shut down either wholly or in part, and date of reopening is indefinite. It is essential that rubber belting be protected from deterioration during the shut-down period if economical operating costs are to be enjoyed when plants are re-opened.

After an exhaustive study on the storage of rubber products, The B. F. Goodrich Company, Akron, O., says in a recent bulletin:

"Belts should be stored in a dark, cool (not over 70 degrees Fahrenheit) place which is maintained under humidity conditions which are not too dry. This does not mean belts should be stored with one end standing wet, but the air of the warehouse should not be too dry. Direct sunlight and warm air should be avoided wherever possible.

"To further protect belting in storage the following preparation may be used to treat the edges and exposed face of belts in rolls form:

One quart shellac
One pint alcohol
One and one-half quarts household ammonia
Three quarts water.

"This solution can be quickly applied with a whitewash brush. One gallon should cover about 300 sq. ft. It can be purchased already mixed, combined with special age-resisting chemicals.

"Where plant owners do not feel the shut-down period will be of sufficient duration to take off the belts and roll them up, it is suggested that the installation be checked to make certain tension has been removed."

Safety Congress (*Continued from page 34*)

a plan were followed by other industries, driving on our streets and highways would unquestionably be much safer than it is. Following this proposal, it was agreed that a committee would be organized to study the suggestion and to formulate the necessary plans.

Those elected to serve on the Executive Committee of the Cement Section for the coming year include:

General Chairman: W. L. White, Jr., Medusa Portland Cement Co., Cleveland, O.

Vice-Chairman: David Adam, Lawrence Portland Cement Co., Northampton, Pa.

Secretary: A. J. R. Curtis, Portland Cement Assn., Chicago.

News-Letter Editor: Jack Dempster, Canada Cement Co., Ltd., Port Colborne, Ont., Can.

Poster Committee Chairman: A. R. Couchman, North American Cement Corp., Martinsburg, W. Va.

Program Committee Chairman: J. B. Zook, Great Lakes Portland Cement Corp., Buffalo, N. Y.

Membership Committee Chairman: H. A. Reninger, Lehigh Portland Cement Co., Allentown, Pa.

Engineering Committee Chairman: Frederick B. Hunt, Nazareth Cement Co., Nazareth, Pa.

Members at Large: Charles P. Benner, Lehigh Portland Cement Co., Allentown, Pa.; W. W. Hamilton, Alpha Portland Cement Co., Easton, Pa.; W. M. Powell, Medusa Portland Cement Co., Cleveland, O.

Members elected to serve on next year's Quarry Section Executive Committee include:

General Chairman: Otho M. Graves, General Crushed Stone Co., Easton, Pa.

Vice-Chairman: S. M. Shallcross, American Lime & Stone Co., Bellefonte, Pa.

Secretary and News-Letter Editor: Ralph Dinsmore, Warner Co., Philadelphia, Pa.

Poster Committee Chairman: H. F. Yotter, General Crushed Stone Co., Easton, Pa.

Publicity Committee Chairman: J. R. Boyd, National Crushed Stone Assn., Washington, D. C.

Statistics Committee Chairman: W. W. Adams, U. S. Bureau of Mines, Washington, D. C.

Members at Large: R. E. Colville, United States Gypsum Co., Chicago; V. P. Ahearn, National Sand & Gravel Assn., Washington, D. C.; Norman G. Hough, National Lime Assn., Washington, D. C.; William H. Baker, J. E. Baker Co., York, Pa.; A. L. Worthen, Connecticut Quarries Co., Inc., New Haven, Conn.

Lt. Col. Henry A. Reninger, Lehigh Portland Cement Co., Allentown, Pa., by virtue of his past presidency of the National Safety Council, automatically continues as a director and a member of the Executive Committee of this organization. W. L. White, Jr., Medusa Portland Cement Co., Cleveland, Ohio, was elected to serve for one year as a member of the council's Executive Committee.

American 1931 Lime Output Declines 38.7 Per Cent. from 1929 Level

According to a preliminary tabulation of data collected in the Census of Manufactures taken in 1932, lime to the value of $18,167,660 (at f.o.b. factory prices) was manufactured in the United States in 1931, a decrease of 38.7 per cent., as compared with $29,627,681 reported for 1929, the last preceding census year. The items which make up the total for 1931 are as follows: Quicklime, 1,503,258 tons, valued at $9,631,937; hydrated lime, 1,138,786 tons, $7,095,971; agricultural lime, 313,929 tons, $1,439,752.

This industry, as defined for census purposes, embraces establishments engaged wholly or principally in the manufacture of lime, chiefly from limestone, but to a small extent from shell and other substances.

Statistics for 1931, with comparative figures for 1929, are given in the tables. The figures for 1931 are preliminary and subject to revision.

Table I—SUMMARY FOR THE INDUSTRY: 1931 AND 1929

	1931	1929	Decrease (*per cent.*)
Number of establishments	205	237	13.5
Wage earners (average for the year)[1]	6,679	8,554	21.9
Wages[2]	$5,999,813	$9,476,314	36.7
Cost of materials, containers for products, fuel, and purchased electric energy[2]	$8,756,960	$13,907,760	37.0
Products, total value[2, 3]	$22,089,412	$35,815,658	38.3
Lime	$17,911,241	$29,095,064	38.4
Other products	$4,178,171	$6,720,594	37.8
Value added by manufacture[4]	$13,332,452	$21,907,898	39.1

[1] Not including salaried officers and employees. The average number of wage earners is based on the numbers reported for the several months of the year. This average probably exceeds somewhat the number that would have been required for the work performed if all had been continuously employed throughout the year, because of the fact that manufacturers report the number employed on or about the 15th day of each month, as shown by the pay-rolls, usually, taking no account of the possibility that some of or all the wage earners may have been on part time or for some other reason may not actually have worked the entire month. Thus, it becomes necessary to give equal weight to full-time and part-time wage earners in calculating the average, and therefore the average may overstate somewhat the amount of full-time employment. For this reason the quotient obtained by dividing the amount of wages by the average number of wage earners can not be accepted as representing the average wage received by full-time wage earners. In making comparisons between the figures for 1931 and 1929, the possibility that the proportion of part-time employment was larger in one year than in the other should be taken into account.

[2] Manufacturers' profits can not be calculated from the census figures because no data are collected for certain expense items, such as salaries, interest on investment, rent, depreciation, taxes, insurance, and advertising.

[3] For 1931, production; for 1929, sales (shipments or deliveries) by manufacturers.

[4] Value of products less cost of materials, containers for products, fuel, and purchased electric energy.

Table II—LIME PRODUCTION, BY KIND, QUANTITY, AND VALUE: 1931 AND 1929

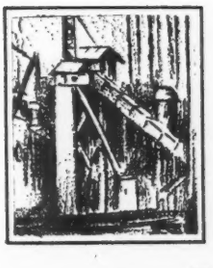
[The figures for 1931 represent production; those for 1929 refer to sales (shipments or deliveries) by manufacturers]

	1931	1929
Lime made in all industries, total value	$18,167,660	$29,627,681
Made in the lime industry, value	$17,911,241	$29,095,064
Made as a secondary product in other industries, value	$256,419	$532,617
Quicklime:		
Tons	1,503,258	1,948,812
Value	$9,631,937	$15,709,849
Hydrated lime:		
Tons	1,138,786	1,307,192
Value	$7,095,971	$11,383,781
Agricultural lime:		
Tons	313,929	755,682
Value	$1,439,752	$2,482,238
Not distributed by kind, value		$51,813

MEN OF THE INDUSTRY

CHARLES SCHMUTZ

LONG identified with the Portland-cement industry and recognized as one of its ablest executives, Mr. Schmutz was recently elected president and general manager of the Bessemer Cement Corp., of Youngstown, O., having formerly been vice-president and sales manager. He succeeds L. A. Beeghley, who became chairman of the board. The corporation manages and markets the output of the Bessemer Limestone & Cement Co. and the Federal Portland Cement Co. Mr. Schmutz was one of the executives of the original Bessemer company before it was merged with the Beeghley interests.



Personal Mention

B. B. Branstetter, sales manager of the Blackwater Stone Co., of Kansas City has been active recently in efforts to obtain a readjustment of less-than-carload freight rates on agricultural limestone from Kansas City to the surrounding territory.

J. H. Cowell, silica-sand operator near Meade, Kan., has acquired additional deposits and reports that increased production will be under way shortly.

H. W. Seitz recently sold his interest in the Mt. Carmel Sand & Gravel Co. to A. C. and V. N. Rehnquist, who for the last few years have been in active charge of the plant. Mr. Seitz has been in the gravel business in Mt. Carmel for 23 yr., but in the last few years had retired from active participation in the company affairs. The plant employs more than a dozen men and has been in full operation all year.

John J. Porter was recently elected president of the North American Cement Corp., Albany, N. Y., to succeed the late Frederick W. Kelley. Mr. Porter had been vice-president and general manager of the corporation since its organization.

H. F. Clemmer, engineer of tests and materials, of the engineering department of the District of Columbia, has been chosen as the new chairman of Committee D-4 on Road and Paving Materials of the American Society for Testing Materials.

E. W. Rice, chief chemist of the Santa Cruz Portland Cement Co., of Santa Cruz, Cal., has returned to his home after attending the annual convention of the American Chemical Society at Denver, Colo. He was accompanied by Mrs. Rice and their daughter, Vivian.

Louis E. Underwood, managing engineer of the stationary-motor engineering department of the General Electric Co. at Lynn, Mass., has been appointed manager of the Pittsfield, Mass., works of the company to succeed E. A. Wagner, who has retired.

Frank F. Beeby has recently become associated with Cement Gun Co., Inc., at its Chicago office, located at 549 W. Washington St.

R. H. Picher of the Mines Branch, Canada, is making a study of road gravel resources in Nova Scotia, New Brunswick and Ontario. He will make surveys of the deposits and collect samples for testing the suitability of these gravels for road surfacing and concrete construction.

Obituary

Clare Sprague, of Oxford, Mich., was killed recently at the pit of the American Aggregates Corp. in that city. He was a steam-shovel operator and was buried under ten feet of gravel by a cave-in.

Harry C. James, 64 yr. old, treasurer of the Ideal Cement Co., died recently at his home near Denver, Colo. Mr. James was also vice-president of the Denver National Bank and was interested in a number of mining companies.

M. A. Reeb, at one time president and general manager of the Niagara Gypsum Co., of Buffalo, N. Y., before it was absorbed by the United States Gypsum Co., died at his home in Buffalo recently.

Alvis J. Redd, 55, president of the Enterprise Marble Co., Atlanta, Ga., died at an Atlanta hospital on Sept. 21. He was well known in the city, having been in the marble business in Atlanta for 40 years.

Eliot Morris, engaged in the production of crushed stone at Searcy, Ark., died at his home there a short time ago at the age of 34 years. Mr. Morris was at one time general superintendent of the plant and quarries of the American Lime & Stone Co. at Bellefonte, Pa.

C. A. Morris, 62, who for the past six years has operated the Red River Stone Co., Searcy, Ark., died September 28 following an attack of pneumonia. Before coming to Arkansas Mr. Morris lived at Macon, Ga. His company furnished a large amount of stone for highway construction throughout Arkansas.

Hans Goos, president and manager of the Builders' Lime & Cement Co. and president, treasurer and manager of the Builders' Sand & Gravel Co., of Davenport, Ia., died recently of apoplexy at his home in that city. Mr. Goos had been in charge of these operations since the retirement in 1900 of his father, Hans Goos, Sr., who founded the gravel company in 1853. Mr. Goos was 62 yr. old and a lifelong resident of Davenport, having received his education in the local high school and Brown's Business College.

▼ *Coming Events* ▲

November 14-18, 1932. Washington, D. C. Annual meeting, American Assn. of State Highway Officials.

December 5-9, 1932. New Orleans, La. Tenth Annual Asphalt Paving Conference and annual meeting, Assn. of Asphalt Paving Technologists. Under auspices of Asphalt Institute, 801 Second Ave., N. Y.

December 5-10, 1932. New York, N. Y. Tenth National Exposition of Power and Mechanical Engineering. Under management of International Exposition Co., Grand Central Palace. New York, N. Y.

December 7-9, 1932. Washington, D. C. Annual meeting, American Institute of Chemical Engineers.

Jan. 16-20, 1933. Detroit, Mich. Highway and Building Congress. Annual Conventions and Combined Show of National Crushed Stone Assn. (Jan. 16-18), National Sand & Gravel Assn. (Jan. 17-18), and National Ready-Mixed Concrete Assn. (Jan. 18), Book-Cadillac Hotel.

February 20-23, 1933, Chicago, Ill. Twenty-ninth annual convention, American Concrete Institute. Harvey Whipple, secretary, 2970 W. Grand Blvd., Detroit, Mich.

June 26-30, 1933. Chicago, Ill. Annual meeting, American Society for Testing Materials, Stevens Hotel. C. L. Warwick, secretary-treasurer, 1315 Spruce St., Philadelphia, Pa.

Traffic News and Comment

Recent I. C. C. Decisions

Cement.—The commission has awarded reparation on finding that the rates on cement from Dewey, Okla., to points in Texas were applicable, but that certain of them were unreasonable. Rates charged on shipments to Seagraves between Feb. 25, 1930, and Jan. 11, 1932, inclusive, and on shipments to Henderson, Petrolia and Wellington, between Feb. 25, 1930, and April 13, 1932, inclusive, and to Cross Plains between Feb. 25, 1930, and May 15, 1932, inclusive, were unreasonable to the extent that they exceeded 30 c. to Seagraves, 22 c. to Henderson, 24 c. to Petrolia, 24½ c. to Wellington and 28 c. to Cross Plains. The rates charged on and after Feb. 25, 1930, were found unreasonable to the extent that they exceeded or may exceed 23½ c. to Byers and 27 c. to Stamford. The rates given are subject to the authorized emergency charge on shipments moving on and after Jan. 4, 1932.—I. C. C. Docket No. 25,124, Dewey Portland Cement Co. *v.* A. T. & S. F. *et al.* (PIT AND QUARRY, Aug. 10, 1932.)

Crushed Stone.—Finding the rates on crushed stone from Campbell, Pa., to destinations in Maryland not unreasonable, the commission has dismissed the complaint in I. C. C. Docket No. 24,736, York Valley Lime & Stone Co., Inc. *v.* Pennsylvania. (PIT AND QUARRY, July 13, 1932.)

Rate Committee Dockets

New England Freight Assn.

Agricultural Limestone.—Shippers propose to reduce the rates on agricultural limestone, car-load minimum weight 50,000 lb., from Falls Village, Conn., to the stations named in Item 135-B of N. H. R. R., I. C. C. No. F-3,105, proposing rates the same as those currently in effect from Ashley Falls and Lee, Mass. Representative rates are: To Caribou and Presque Isle, Me., present, 46 c., proposed 32½ c.; to Limestone and Van Buron, Me., present 48 c., proposed 33½ c.—Docket No. 26,807.

Cancellation of Combination Tariff.—It is proposed to cancel Agent Jones' Tariff 228, I. C. C. U. S. 1, and all reference thereto in other tariffs applying within and from New England to points in the United States, attention being directed to the following portion of the notice issued by the I. C. C. under date of July 22, 1932: "Shippers who object to cancellation of the rule without the publication of additional joint or proportional rates should, on or before Oct. 15, 1932, furnish publishing carriers and agents a list of the tariffs now subject to the rule under which shipments are moving, indicating what additional rates they believe should be published, forwarding copies thereof to the commission and to Agent Jones."—Docket No. 599-1-D.

Trunk-Line Assn.

Crushed Stone.—Shippers at Billmyer, Union Stone Co., and Bainbridge, Pa., propose the establishment of rates on crushed stone [1] to destinations on the M. & P. R. R., ranging from 90 c. to $1.45 per net ton. A statement of the proposed rates will be furnished on request.—Docket No. 29,872.

Carriers propose to publish a rate on crushed stone [1] from Monocacy, Pa., to New Boston Jct., Pa., of 90 c. per net ton.—Docket No. 29,850, Sup. 1.

A reduction in the rate on crushed stone [1] from York, Pa., to White Plain, Md., from $1.50 to $1.25 per ton to expire Mar. 31, 1933, is proposed by shippers.—Docket No. 29,898.

The use of the following mileage scale is proposed in establishing rates on crushed stone [1] from Upper Montclair, N. J., and Montclair Heights, N. J., to destinations on the Erie R. R. in Trunk-Line territory. This is a carrier's proposal.

Miles	Rate	Miles	Rate	Miles	Rate
15	$0.60	125	$1.20	290	$1.80
25	.70	150	1.30	320	1.90
40	.80	175	1.40	350	2.00
60	.90	200	1.50	380	2.10
80	1.00	230	1.60	410	2.20
100	1.10	260	1.70	440	2.30

Fluxing Stone.—Shippers propose the establishment of a rate on crude fluxing stone [1] from Bellefonte and Pleasant Gap, Pa., to Blossburg, Pa., of $1.79 per gross ton.—Docket No. 29,896.

Ground Limestone.—Shippers at Munn's, N. Y., propose publication of a line of rates on ground limestone, car-load minimum weight, 50,000 lb., to various stations on the D. L. & W., ranging from $1.10 to $1.70 per net ton. A complete statement of the proposed rates will be furnished on request.—Docket No. 29,878 (cancelling No. 26,543).

The following rates per 100 lb. are proposed to apply on ground limestone, car-load minimum weight 50,000 lb., from Howe's Cave, N. Y., to B. & A. stations: Boston, Mass., to Springfield, Mass., inclusive, 16 c.; Indian Orchard, Mass., to Delton, Mass., inclusive, 15 c.; Pittsfield, Mass., to Richmond Furnace, Mass., inclusive, 13 c. per. This is a shipper's proposal.—Docket No. 29,882.

Shippers propose a rate of 11 c. per 100 lb., on ground limestone, car-load minimum weight 50,000 lb., from Grove and Frederick, Md., Engle, Martinsburg and Millville, W. Va., to Fairchance, Pa.—Docket No. 29,901.

Carriers propose to amend the foregoing proposal to read: "Boston to Athol, Mass., 16 c.; West Springfield, Mass., to Dalton, Mass., 15 c.; Pittsfield, Mass., to Richmond Furnace, Mass., 13 c.—Docket No. 29,882, Sup. 1.

Plaster and Plaster Articles.—To eliminate fourth-section departures, the carriers propose to establish on (a) plaster and related articles and on (b) plaster-board, car-load, minimum weight and description as per N. Y. C. I. C. C., 16,278 and W. S. I. C. C. 6,658, from Akron, Oakfield, Wheatville, Clarence Centre and Transit, N. Y., to St. Joe, Pa., to Foxburg, Pa., inclusive, St. Petersburg, Pa., to Shippenville, Pa., inclusive, and Byrners, Pa., to Madge, Pa., inclusive; (a) 15½ c. and (b) 17 c. per 100 lb.—Docket No. 29,913.

Sand.—A reduction in the rate on common sand [1] from Morrisville, Pa., to Coatesville, Pa., from $1.05 to 90 c. per net ton is proposed by shippers.—Docket No. 29,873.

Shippers propose a reduction in the rate on sand [1] from Masonville and South Pemberton, N. J., to Fish House, N. J., from 75 c. to 69 c. per net ton.—Docket No. 29,875.

Sand and Gravel.—A reduction in the rate on common sand and gravel [1] from Boonville, N. Y., to Martinsburg, N. Y., from 75 c. to 60 c. per net ton is proposed by shippers.—Docket No. 29,886.

Shippers propose a line of rates on sand and gravel [1] from Hanover, Va., to various C. & O. stations ranging from 81 c. to $1.54 per net ton. A complete statement of the proposed rates will be furnished on request.—Docket No. 29,920.

Soapstone.—Shippers propose a rate of $2.10 per net ton on ground soapstone and talc, car-load minimum weight 36,000 lb., from Easton, Pa., to Jersey City, N. J. The sixth-class rate now applies.—Docket No. 29,899.

Sulphur.—Carriers propose to publish the following rates per 100 lb. on ground sulphur, car-load minimum weight 60,000 lb., to Barberton, O.: from Baltimore, Md., 24 c.; Philadelphia, Pa., 25 c.; and New York, N. Y., 27 c.—Docket No. 29,834, Sup. 1.

Central Freight Assn.

Amiesite.—Shippers have proposed a line of rates on crushed stone, sand and dust coated with asphaltic cement, from Toledo, O., to destinations in Indiana, Michigan and Ohio. Representative proposed rates are: To Arlington, O., $1.30; to Fostoria, O., $1.07; to Portage, O., $1.00 per net ton.—Docket No. 33,232.

A reduction in the rate on coated sand, gravel and stone from Indianapolis, Ind., to Muncie, Ind., from $1.50 to $1.30 per net ton is pro-

posed by shippers.—Docket No. 33,-152.

Cement.—Carriers propose to publish a rate of 14½ c. on cement, car-load minimum weight 50,000 lb., from Bay City, Mich., to Newberry, Mich.

Crushed Stone.—Shippers at Bellevue, O., propose a rate on crushed stone and related articles [1] to Cortland, O., of $1.15 per net ton.—Docket No. 33,231.

Feldspar.—A commodity rate of $1.62 a net ton is proposed by shippers to apply on feldspar and ground cornwall stone, car-load minimum weight 50,000 lb., from East Liverpool, O., to East Sparta, O.

Sand—Shippers at Kokomo, Ind., propose a rate of $1.90 per net ton on burned or refuse foundry sand to Barberton, O., in Docket No. 33,164, and on refuse or burned glass sand, a rate of $1.90 in open cars and $2.10 per ton in box cars, in Docket No. 33,-234.

Sand and Gravel.—Shippers propose a reduction in the rate on common sand and gravel from Hugo, O., to North Randall and Solon, O., from 80 c. to 70 c. per net ton.—Docket No. 33,154.

Carriers propose a reduction in the rate on sand and gravel from Cleveland, O., to Burghill, O., from $1.15 to 95 c. per net ton.—Docket No. 33,-235.

Sand, Gravel, Stone and Slag.—Carriers propose to publish the following rates on sand, gravel, crushed stone and slag from Buffalo, N. Y.: To Mill Village, Miller's and Cambridge Springs, Pa., $1.10; to Venango and Saegertown, Pa., $1.20 a net ton.—Docket No. 33,163.

Slag.—Shippers propose a rate of $1.80 per ton on crude or granulated slag from Weirton, W. Va., to Buffalo, N. Y.—Docket No. 33,138.

Illinois Freight Assn.

Amiesite.—It is proposed to establish rates on sand and gravel, coated with oil, tar or asphaltum, from Aurora, Ill., to stations in Illinois, based on the following scale: 25 mi. 96 c.; 40 mi. $1.07; 60 mi. $1.19; 75 mi. $1.30; 100 mi. $1.42; 125 mi. $1.53; 150 mi. $1.76.—Docket No. 3,-339, Sup. 6.

It is proposed to establish joint-line rates on coated sand [1] from Ottawa, Ill., to stations on connecting lines, based on the single-line basis plus 20 c. per ton.—Docket No. 3,339, Sup. 7.

Agricultural Limestone.—The following rates are proposed to apply on agricultural limestone [1] in open-top cars from Alton, Ill., to destinations on the P. R. R.: Altamont, Ill., 98 c.; Casey, Ill., $1.10; Collinsville, Ill., 80 c.; Dennison, Ill., $1.21; Effingham, Ill., $1.05; Vandalia, Ill., 98 c.—Docket No. 6,881.

Lime.—It is proposed to apply 80 per cent. of the present rate of 9½ c., which applies on lime, car-load minimum weight, 30,000 lb., from Cordova and Port Byron, Ill., to Dixon, Ill., on a car-load minimum weight of 50,000 lb.

Sand.—It is proposed to reduce the rate on silica sand from Browntown, Wis., to East St. Louis, Ill., and St. Louis, Mo., from $2.40 to $2.11 for processed sand and $1.99 per ton for crude sand.—Docket No. 5,301-A.

Sand and Gravel.—Reductions in the rates on sand and gravel from Elco, Ill., are proposed as follows, in Docket No. 5,963:

To	Present	Proposed
Cayce, Ky.	$0.90	$0.80
Trenton, Tenn.	1.10	1.00
Gilmore, Tenn.	1.20	1.10
Ramer, Tenn.	1.35	1.30

Western Trunk-Line Committee

Amiesite.—Shippers propose the establishment on Kansas state traffic the mileage scale of rates published in Item 235 of W. T. L. Tariff 210, on asphalt rock, natural or coated, and on crushed or ground stone, sand and gravel coated with road oil, from La Cygne, Kan.—Docket No. 8,132.

Sand and Gravel.—At present sand and gravel from W. T. L. territory to eastern points named in C. F. A. Tariffs 491 and 492-A is rated sixth class in Official Classification. Shippers propose that this be changed to Class E in Western Classification.—Docket No. 8,127.

Southern Freight Assn.

Crushed Stone.—It is proposed to reduce the rate on crushed stone [1] from Lary, Fla., to Lakeland, Fla., to $1.45 per net ton.—Docket No. 59,262.

Feldspar.—Shippers propose in Docket No. 59,238 the following reduced rates per net ton on feldspar, car-load minimum weight, 50,000 lb., from shipping points on the Southern Ry., in Western North Carolina: To Chicago, Ill., $6.69; to Frankfort, Ind., $6.09; to Indianapolis, Ind., $5.49. They propose the following rates from (a) Black Mountain, N. C., group and from (b) the Bryson, N. C., group in Docket No. 59,309:

To	(a)	(b)
Baltimore, Md.	$4.45*	$4.65
Bristol, Pa.	5.00	5.20
Havre De Grace, Md.	4.81*	5.01
Herrin Run, Md.	4.45	4.65
Lancaster, Pa.	4.81*	5.01
Morrisville, Pa.	5.00	5.20
Norristown, Pa.	4.81*	5.01
Philadelphia, Pa.	4.81*	5.01
Reading, Pa.	4.81	5.01
Trenton, N. J.	5.00	5.20
Wilmington, Del.	4.81*	5.01
York, Pa.	4.81	5.01

* No change in rate.

Ground Limestone.—It is proposed to amend p. 3 of Agent Speiden's Limestone Tariff 248 by transferring the O. & W. R. R. from Note B to Note A, which will have the effect of authorizing standard line rates via this line.—Docket No. 59,318.

Lime.—Carriers propose to establish rates on agricultural, chemical and fluxing lime, from Knoxville, River Front Extension, and South Knoxville Extension, Tenn., to Ohio destinations based on 80 per cent. of the common lime scale prescribed in I. C. C. Docket No. 16,170, the car-load minimum weight to be 50,000 lb.—Docket No. 59,379.

Mica.—It is proposed to establish a reduced rate of 30 c. per 100 lb., on crude or scrap mica, car-load minimum weight 60,000 lb., from Axton, Carlisle and Martinsville, Va., to Chicago, Ill.—Docket No. 59,380.

Sand and Gravel.—It is proposed to publish a rate on sand and gravel [1] from Miami and Willys, O., to Paris, Ky., of $1.20 per net ton.—Docket No. 59,291.

Soapstone or Talc.—At the request of shippers for a through rate, carriers suggest a rate of $2.70 per net ton on pulverized soapstone or talc [1] from Carterville, Ga., to Savannah and Port Wentworth, Ga.—Docket No. 59,251.

Southwestern Freight Bureau

Agricultural Limestone.—Shippers request a rating of class or column 27½ on agricultural limestone, less than carload, from, to and between all points covered by S. W. L. Tariffs 151, 152-B, 153, 154B, 104C and 159A.

Cement.—Carriers propose to establish rates on cement from Alpha, Prospect Hill and St. Louis, Mo., to points on the Mo. Pac. west of Maplewood, Mo., ranging from 2 c. per 100 lb., from Alpha to Tesson Road and Grants, to 7 c. from the three origins named to Creve Coeur. A complete statement will be furnished on request. These rates are proposed to meet motor-truck competition.—Docket No. 25,670.

Shippers have asked for the publication of a rate of 26½ c. per 10 lb., on cement, car-load minimum weight 50,000 lb., from Concrete and Portland, Colo., to Benonine, Tex.—Docket No. 25,689.

[1] The car-load minimum weight will be 90 per cent. of the marked capacity of the car, except that when the car is loaded to its full cubical or visible capacity, the actual weight will apply.

Decided Improvement in Cement Trade Being Felt

Demand for cement in the far northwest is on the increase and the Lehigh Portland Cement Co. plant at Metaline Falls, Wash., is to reöpen shortly, according to W. G. Perrow, district manager. Large stocks on hand have been nearly depleted.

"The really encouraging feature of the cement business," Mr. Perrow said, "is the decided improvement in the country trade. Orders from small towns and cities throughout the Inland Empire the last 60 days have increased 25 per cent., and this is a conservative estimate.

"Orders of this character indicate the return of confidence in the territory as a whole. The volume of our orders and the amount of cement involved is such as to indicate we will do better for the balance of this year than in the same period a year ago."

Foreign Developments

Makes Colored Plaster From Extra-Fine Lime

At the Stettin cement plant, known as the oldest Continental cement factory, a very fine hydraulic-lime dust that accumulates used to have no use except as an ingredient mixed with the regular coarser product for mortar. Study of this extra-fine material revealed that because of its fineness and porosity it is an excellent base, and after further study it has been found possible to utilize it by coloring it with various appropriate coloring substances (in gray, yellow, red, violet, brown and green) and sell it for stucco or plaster work where color is desired. The material is very plastic, and has a strength approaching that of Portland cement. It can be used for either inner or outer walls, for roofs, for bath-room walls, etc., and can be applied smooth enough to be washable.—*Tonindustrie-Zeitung*, 56:828, Aug. 15, 1932.

Find Iron is Retarder In Aluminous Cement

In spite of the great amount of research on fused alumina cements, practically nothing has been done to determine the importance and function of the iron compounds entering into such cements (a work of P. H. Bates being a notable exception). Researches at the Institute of Cement Technology at the Berlin Technical College sought to study this question, and the results are reported in this paper. The procedure consisted in general of preparing alumina cements without iron and with varying percentages of iron. The study indicates that:

(1) The assumption that silica in the range of the alumina cements is combined with 2 molecules of lime to form $2CaO.SiO_2$ limits these cements on the low-lime side for the alumina components through tricalciumpenta-aluminate. In cements saturated so low with lime the iron oxide has already gone into combination as $2CaO.Fe_2O_3$. The $CaO.Fe_2O_3$ is thus lacking in alumina cements.

(2) On the addition of further lime the aluminate is saturated to $CaO.Al_2O_3$ and the ferrite combines with the $CaO.Al_2O_3$ and CaO to $4CaO.Al_2O_3.Fe_2O_3$. Compounds higher in lime are not concerned.

(3) The presence of iron compounds acts in general as a retarder in the setting process.

(4) If the iron components are present in the form of $2CaO.Fe_2O_3$ even small quantities cause this retardation. Yet with increasing proportion there is no longer any considerable influencing of the setting time.

(5) In contrast to the dicalciumferrite, the $4CaO.Al_2O_3.Fe_2O_3$, which in pure form is a rapid setter, retards only when present in small quantities. With increasing proportion of the Brownmiller compound the retardation is less and less until actually there is an acceleration of set. The occasional rapid binders seem therefore to be accounted for rather by the presence of certain quantities of the compound $5CaO.3Al_2O_3$.

(6) The iron content acts on standard alumina cements, even in small quantities, to lower the strength properties. This effect increases with increase in the iron compounds.

(7) The higher lime saturation required to obtain the best strengths in cements high in silica is not dependent on the iron content of these cements.

(8) Good fused cements (commercial cements) should preferably contain not more than 6 per cent. SiO_2 and 15 per cent. Fe_2O_3 in proportion to the finished cement. The lime content should be so calculated that the compounds $2CaO.SiO_2$, $CaO.Al_2O_3$ and $2CaO.Fe_2O_3$ can be formed.—Dr.-Ing. Hans Richter in *Zement*, 21:445-449, 457-462, 471-476 and 485-489, Aug. 4, 11, 18 and 25, 1932.

Electric Heating Found Practical for Concrete

Investigations reported at the Swedish Royal Academy of Engineering Science, Stockholm, show that electrothermal heating has exactly the same action on the hardening of cement as has any other kind of heat, and is accordingly practical for the curing of concrete in winter or for hastening the hardening, if so desired, even in temperate weather. Alternating current is specified, and the power consumption placed at 1 kw.-hr. for 1 cu. m. times hours available per degree Celsius. The report was presented by Albert Brund and Lector Helge Bohlin.—*Cemento* (Barcelona), 4:311-317, Sept., 1932.

Study Alite Crystals In Deposits in Kiln

Difficulties in the quantitative separation of alite from other minerals of Portland-cement clinker have made it impossible to demonstrate conclusively that alite consists of pure tricalcium-silicate and is not a mixed crystal of $3CaO.SiO_2$ with a slight content of $3CaO.Al_2O_3$. Even the complete correspondence of the Index of refraction and the optical character of tricalcium-silicate with those of alite are not proof, since the refractory index of $3CaO.Al_2O_3$ is almost identical.

This made it particularly interesting to observe that in a short rotary kiln with MgO lining, in which test samples had been burned with standard raw mix and fluorspar admixture but at higher temperature, the kiln when stopped had accumulated deposits showing a stratification of materials of varying colors. The outer layer exposed to the flame was white, and in this part the composition was essentially alite crystals adjoining one another, while in the darker lower strata the alite crystals were embedded in a darker matrix. X-ray and chemical examinations of this white stratum showed that the crystals formed there had the optical properties of tricalcium-silicate but that tricalcium-aluminate was present.

Roentgenographic comparisons of the white (alite) clinker and a prepared mixture of 96 per cent. 3CaO.SiO and 4 per cent. $3CaO.Al_2O_3$ showed lines present in the latter and lacking in the former, indicating a low content of the aluminate in the mixed crystal. When the mixed preparation was heated 15 hr. at 1,380 deg. the lines had disappeared. Further studies are being made to determine the limits of the mixed-crystal formation.

Chemical examination shows that the position of the white clinker deposit in the ternary system $CaO-Al_2O_3-SiO_2$ is out of the range of Portland cement because of the diminution of the Al_2O_3 content to the $CaO-SiO_2$ side of the ternary system. The relation of CaO to SiO_2 is not noticeably altered in this reaction.—H. E. Schwiete and W. Büssem in *Tonindustrie-Zeitung*, 56:801-804, Aug. 8, 1932.

Italian Cement Plant Shows Uses of Concrete

In a new plant of thoroughly modern conception and execution, located at Settimello, near Florence, Italy, the C. I. M. A. cement company has demonstrated very effectively the practicability and, at the same time, the architectural beauty of reinforced concrete for industrial structures. The plant is situated on a hillside, and one of its interesting features is that it was planned so as to take advantage of gravity for a great deal of the conveying processes. The plant as a whole consists of ten structural units, the design of which is described in some detail in this article: a marl-crushing unit, a marl-grinding unit, the rotary kiln and housing, the coal storage, a coal-drying plant, a coal-grinding unit, clinker storage, cement-grinding unit, cement silos and a bagging and shipping unit.—*Il Cemento Armato* (Milan), 29:90-96, Aug., 1932.

Recent Patents

AMERICAN

Concrete

Concrete mixer. Alfred E. Mason, San Francisco, Cal. No. 1,878,504.

Water-measuring tank for concrete pavers. Floyd W. DeVinney, Nunda, N. Y., assignor to Foote Co., same place. No. 1,879,129.

Crushing

Hammer crusher. George W. Borton, New Lisbon, N. J., assignor to Pennsylvania Crusher Co., New York, N. Y. No. 1,877,121.

Machine for crushing coal, stone, and similar materials. Henry Martinez and Robert H. Kirk, Newcastle-upon-Tyne, England, assignors to Winget, Ltd., Warwick, England. No. 1,877,188.

Drilling

Rock drill. William A. Smith, Sr., Easton, Pa., assignor to Ingersoll-Rand Co., Jersey City, N. J. No. 1,878,905.

Excavating

Bucket lip. John W. Page, Chicago, Ill. No. 1,879,447.

Accelerator for power shovels. Claude Pennington, San Diego, Cal., assignor to Koehring Co., Milwaukee, Wis. No. 1,877,427.

Lime

Lime hydrator. Hugh Miscampbell, Duluth, Minn., assignor to Blaw-Knox Co., Pittsburgh, Pa. No. 1,877,010.

Lime mixture. Julius E. Underwood and Charles A. Cabell, Washington, D. C., assignors to National Lime Assn. No. 1,878,206.

Loading

Loading device. Sidney W. Farnham, Chicago, Ill., assignor to Goodman Mfg. Co., same place. No. 1,877,286.

Loading machine. Frederick W. Vodoz, Wilmette, Ill., assignor to Goodman Mfg. Co., Chicago, Ill. No. 1,878,037.

Separating

Process of and apparatus for separating materials. Lloyd A. Hatch, St. Paul, Minn., assignor to Minnesota Mining & Mfg. Co., same place. No. 1,877,861.

FOREIGN

Cement

Apparatus and process for producing fused cement. Arno Andreas, Münster, Westphalia. German 552,339.

Apparatus for the treatment of powdery, slurry-like or granular material, especially for cement production. Arno Andreas, Münster, Westphalia. German 552,236.

Hydraulic binder produced from hydraulic cement and hydraulic lime. "Straba" Strassenbaubedarfs Akt.-Ges., Zurich, Switzerland, assignee of Hermann Plauson, Darmstadt, Germany. Canadian 325,817.

Concrete and Concrete Products

Process for producing water-tight and water-shedding concrete or plaster by addition of particles saturated with oil or grease. Gottfried Schalk, Neuwied. German 552,233.

Manufacture of armored or reinforced-concrete pipes or similar bodies. L. Bille. British 378,932.

Method of curing hydraulic cement concrete. International Bitumen Emulsions Corp., San Francisco, Cal. Canadian 325,999.

Process of retaining water in concrete for the hydration of cement. International Bitumen Emulsions Corp., San Francisco, Cal. Canadian 326,000.

Crushing and Grinding

Centrifugal grinding-mill. Hermann Hildebrandt, Hannover. German 543,769.

Fastening the wearing plates in ball mills. Fried. Krupp Grusonwerk Akt.-Ges., Magdeburg-Buckau. German 543,728.

Grinding apparatus. Henry G. Lykken, Minneapolis, Minn. German 543,729.

Compound tube-mill. Fried. Krupp Grusonwerk Akt.-Ges., Magdeburg-Buckau. German 544,558.

Grinding apparatus. Andre P. H. Labat-Camy, Paris, France. German 544,340.

Roller grinding elements for tube and like mills. Dr. Bruno Faber, Brunswick, Germany. German 544,449.

Hammer-type mill. Josef Otto, Cologne-Lindenthal. German 542,507.

Tube-mill. Fried. Krupp Grusonwerk Akt.-Ges., Magdeburg-Buckau. German 542,914.

Roll-crusher. Braunschweigische Maschinenbau-Anstalt Akt.-Ges., Brunswick. German 543,333.

Process and apparatus for sieving and grinding. Deutsche Babcock & Wilcox Dampfkessel-Werke Akt.-Ges., Oberhausen, Rhineland. German 543,334.

Hammer-mill. Christian Nielsen, Copenhagen, Denmark. German 547,150.

Hammer crusher. G. Polysius Akt.-Ges., Dessau. German 547,151.

Apparatus for grinding and mixing. Dr. Rudolf Bloch and Dr. Carlo Rossetti, Karlsruhe, Bavaria. German 547,152.

Gyratory crusher. Humboldt-Deutzmotoren Akt.-Ges., Cologne-Kalk. German 547,683.

Grinding mill. The Hardinge Co., Inc., assignee of Harlowe Hardinge, York, Pa. Canadian 325,753.

Kilns

Drawing-device for shaft kilns, especially for lump material. Dipl.-Ing. Gerhard Seeger, Berlin-Lankwitz. German 549,938.

Shaft kiln for burning cement or the like, to which the fuel and charge are fed mixed. Dipl.-Ing. Hans Engel, Stettin, Germany. German 550,232 (addition to German 548,663).

Process for feeding slurry to rotary kilns. Adolph Busch, Antwerp, Belgium. German 551,766.

Apparatus for burning cement. Arno Andreas, Münster, Westphalia. German 551,918.

Process and apparatus for removing deposits in rotary kilns by driving plugs in from the outer shell. Arno-Andreas, Münster, Westphalia. German 552,237.

Material-Handling

Winch for automatic grabs and the like. Eisen (vorm. Nagel & Kaemp) Akt.-Ges. British 378,812.

Process for transferring pulverulent material from a bin to a sack, barrel or the like. Carl Pontoppidan, Holte, Denmark. German 545,570.

Overload-indicating means for cranes. T. Smith & Sons (Rodley), Ltd., F. H. Smith, W. T. Smith and G. E. Smith. British 378,881.

Traversing gear for traveling cranes. S. H. Heywood & Co., Ltd., E. Browne, T. L. Price and J. V. Faulks. British 378,987.

Conveyor. Arnold Redler, Sharpness Docks, Gloucester, England. Canadian 325,679.

Jigger conveyor. Ernest Ridgill, Sheffield, Derbyshire, England. Canadian. 325,682.

Conveyor system for filter cake. The Filtration Engineers, Inc., New York, N. Y. Canadian 325,743.

Conveyor or screening apparatus. Woodall-Duckham (1920), Ltd., assignee of Scott Symington, London, England. Canadian 325,846.

Conveyor flight. Redmond H. Pangborn, Tacoma, Wash. Canadian 325,929.

Mixing

Portable hand-operated mixer, especially for the production of concrete, mortar and the like. Jacob Thordsen, Könnern, Saale. German 549,706.

Mixer. Antonio Marsili, Milan, Italy. German 551,224.

Mixer. Bamag-Meguin Akt.-Ges., Berlin. German 552,049.

Concrete mixer. Porter W. Yett, Portland, Ore. German 552,050.

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Manufacturers' Publications

Copies of any of these publications may be had by writing the manufacturers who publish them. Please mention PIT & QUARRY *when writing.*

Boiler Equipment

Type E Stoker Unit. 4 p. (Combustion Engineering Corp., New York, N. Y.) Describes and illustrates a small stoker for small industrial and heating boilers which incorporates all the advantages and performance standards of the large C-E stokers.

Crushing and Pulverizing

From Wet Solids to Dry Powders. 8 p. (Raymond Bros. Impact Pulverizer Co., Chicago, Ill.) A new bulletin describing and illustrating the new Raymond kiln mill and air-drying pulverizer which pulverizes, dries and classifies a product in one continuous operation.

Type BH Gyratory Crusher. 12 p. (Bull. 111. Traylor Engineering & Mfg. Co., Allentown, Pa.) Features of a popular gyratory crusher and a record of its performance are told and pictured in this new publication. Contains a table of sizes and arrangements.

Drilling

Rock Drills and Sharpeners. 32 p. (Ingersoll-Rand Co., New York, N. Y.) A condensed catalogue which consolidates in one volume the essential information concerning I-R equipment for drilling and for reconditioning drill steel. The catalogue covers all accessory equipment and contains instructions for the correct heat treatment of drill steels.

Electrical Equipment

Electric Equipment for Mine Hoists. 24 p. (General Electric Co., Schenectady, N. Y.) Descriptive of practice and accomplishments in mine-hoist service, this booklet will appeal to the operator whose operations are below ground. The various pieces of electrical equipment are described and illustrated in an interesting manner.

Excavators

General Excavators. 20 p. (Bull. 3210. General Excavator Co., Marion, O.) A new catalogue of excavating equipment made by this firm. Included are shovels, pullshovels, clamshells, drag-lines, back-fillers, skimmers and cranes.

Introducing the 16-B. Folder. (Bucyrus-Erie Co., South Milwaukee, Wis.) Describes and illustrates a new ½-cu. yd. excavator claimed to have the greatest power per pound of any on the market.

The Sargent Scout. 4 p. (Sargent Machine Co., Fort Dodge, Ia.) A ½-cu. yd. shovel, convertible to dragline operation is described and illustrated. Among the features of the machine is the absence of a center pin, the machine being revolved on a ball-bearing turntable.

Piping

Armco Spiral Welded Pipe. 40 p. (American Rolling Mill Co., Middletown, O.) Covers the design, manufacture, applications and gives specifications and data of spiral-welded pipe for industrial installation.

Power Transmission

Steel Chains. 144 p. (Cat. No. 1192. Link-Belt Co., Indianapolis, Ind.) A new, illustrated catalogue on steel chains for every application. Many attachment links and a line of sprocket wheels are included.

Metal Links. 4 p. (Mackintosh-Hemphill Co., Pittsburgh, Pa.) A folder which describes and illustrates gears and pinions. Tells of the wear-proofing process employed in the metals used in the making of the gears offered by this concern.

W. H. George, general manager of the Cowell Lime & Cement Co., Cowell, Cal., was host to the building-material dealers and contractors of Contra Costa County at a banquet held September 16 at Cowell.

Pumpings from the Old Pit

Fifteen Years Ago

H. CHASE and S. Linton had just completed a new sand-and-gravel plant at Oregon City, Ore., which was said to be one of the finest plants in the state.

* * *

The new $50,000 plant of the Ottawa Silica Co., at Ottawa, Ill., was almost ready to go into operation. The plant was built of concrete with complete equipment for handling, separating, washing, drying, and pulverizing silica sand to be used for glass manufacture.

Ten Years Ago

NEW companies entering the industry included the Pine Creek Lime & Stone Co., Jersey Shore, Pa.; Palmer-LaRue Sand & Gravel Co., Chagrin Falls, O.; Millwood White Sand Co., Jackson, O.; McClain Sand Co., Point Marion, Pa.; Star Sand Co., Pittsburgh, Pa.; Standard Gypsum Co., San Francisco, Cal.; Western Washed Sand & Gravel Co., Milwaukee, Wis.

* * *

The Egyptian Portland Cement Co., of Fenton, Mich., had leased a portion of the former steel-car works of the Grand Trunk Ry., at Port Huron, Mich., for a term of years. Plans were made to remodel the various buildings and install cement-making equipment, the new plant to go into operation early the next year.

A blast using 55 tons of dynamite had just been set off by the Blue Diamond Materials Co. at its plant at Corona, Cal. The company had been eleven months preparing for this blast, which was one of the largest ever made on the Pacific Coast up to that time.

Five Years Ago

THE Executive Committee of the National Crushed Stone Assn. held its regular preconvention meeting at the Commodore Hotel, New York City, on Friday, Oct. 15. The meeting was devoted largely to the discussion of plans for the national convention to be held at Detroit early the following year.

* * *

September production and shipments of Portland cement were the highest for any month in the history of the industry, according to the Bureau of Mines, Department of Commerce. Shipments amounted to 126,467,000 bbl.

New Machinery and Supplies

New Clinker Cooler Has a Reciprocating Grate

A recent development of interest to cement manufacturers is a new type of clinker cooler developed by the Allis-Chalmers Mfg. Co., Milwaukee, Wis. This cooler consists essentially of a reciprocating grate or vibrating conveyor formed of ¼-in. round bars separated by 1/16-in. openings, through which air is blown from below up, into and through the superimposed clinker. The wind-box for the air below the grate is attached to and reciprocates with it. The conveyor is driven through an eccentric shaft having a speed of 200 to 300 rev. per min., giving 400 to 600 vibrations per min. to the conveyor. This results in the clinker being carried forward slowly in an even bed with constant agitation.

At the ratings proposed for the different sizes of coolers it is estimated that the clinker can be cooled to within 20 deg. of the temperature of the outside air. Any clinker which sifts through the grate into the wind-box is carried forward on the bottom of the box due to its reciprocating motion. This air-quenching cooler is similar to the Lee cooler and the Lepol cooler only to the extent that a grate is used in it.

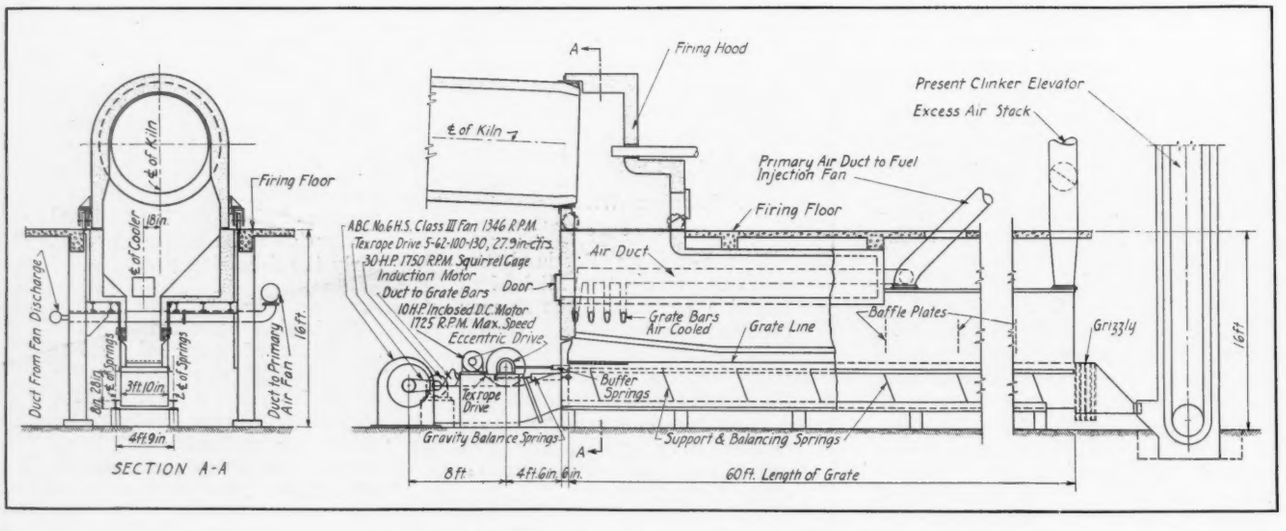
In the development of this cooler an experimental small-size unit was temporarily installed in the plant of the Dewey Portland Cement Co. at Davenport, Ia., in order to obtain accurate data for the rating of the different sizes of coolers to be made. This cooler was designed to cool 6 bbl. of clinker per hr. but actually cooled more than double that amount.

The ½-cu.yd. shovel loading to truck.

Small Excavator Meets Demands of Present Day

Bucyrus-Erie Co. has announced a new ½-cu.yd. excavator, to be known as the 16-B. This new machine combines greater digging ability per pound of weight than any machine that has ever been offered, according to the maker. Its weight is under 30,000 lb. and its big 6-cyl. gasoline engine develops 54 hp. This remarkable combination of digging ability, sturdy strength and light weight has been brought about by a complete new design unhampered by tradition, a design which has incorporated in it all the mechanical refinements that are suggested by 50 yr. of excavating machinery building.

Operators inspecting the machine are impressed by the many new features, among them the following: conical swing rollers rolling between two roller paths eliminating center pintle and center-pintle adjustment; elimination of dead-weight; no dead counterweight; chain-crowd with high-speed retraction; unit assembly; single-shaft-drive mounting; climbs grades of 30 per cent. easily; all clutches interchangeable; all-welded box-girder boom and outside sticks; efficient digging and free-dumping inserted-tooth dipper; greater horsepower per pound of weight. Choice of gasoline, Diesel or electric power, two-speed propel and high speed independent boom-hoist are available. The machine is readily convertible to shovel, drag-line, clamshell, crane, drag-shovel or skimmer scoop.



Cross-sectional elevations of reciprocating-grate clinker cooler.

New Planetary Mill for Closed-Circuit Service

A radical departure from convential designs of grinding equipment is seen in the new planetary mill, announced by Raymond Bros. Impact Pulverizer Co., Chicago.

This advanced machine is said to be the result of extensive development work by the manufacturers in perfecting a specialized unit for closed-circuit operations in conjunction with a mechanical air separator. It is particularly adapted for pulverizing limestone, gypsum and similar nonmetallic minerals, preparatory to classification.

The mill handles raw material direct from the crusher and reduces it in one operation to the fineness required for the separator feed. Where the product contains a mixture of fine material, it is first passed through the separator, and the tailings discharged to the mill for re-grinding. In this way, the available fines are removed without going through the mill. If the product is too coarse, it is fed directly to the mill for preliminary pulverizing, and then elevated to the separator for classifying while the tailings are returned to the mill as before.

The planetary mill offers distinct advantages as a companion unit for the mechanical air separator, forming a combination outfit that shows substantial economies in production, according to the maker. It grinds to a medium degree of fineness, which permits large milling capacity with low power cost. At the same time, it produces a high percentage of fines that assures efficient operation of the separator without maintaining an excessive circulating load.

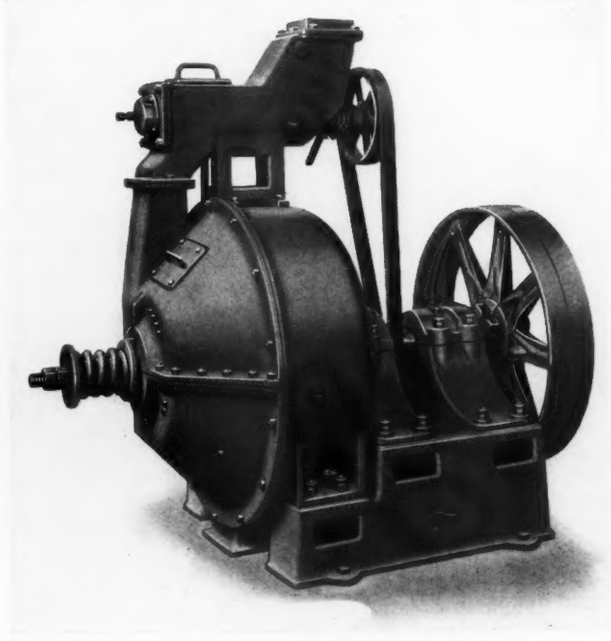
There is a further gain in economy due to the extreme simplicity of the planetary mill. It is exceedingly compact, and can easily be installed in close quarters where it is to be operated in connection with a separator already in place. There are remarkably few parts in the whole assembly, and the wearing elements may readily be replaced. The absence of gears and complicated mechanical parts is a factor that makes for low maintenance cost. The only points that require oiling are those on the main shaft-bearing and the feeder drive.

The mill operates on the ball-and-ring principle. The grinding ring revolves in a vertical plane and is driven by the main shaft through a heavy iron spider. Six large diameter free-rotating balls move in the circular orbit formed by the grooved grinding ring. These balls, separated by a spacer, crush the material against the grinding ring by centrifugal force, rapidly reducing the product to a fine powder. The balls are confined laterally by a pair of beveled disks, one on each side, which are held against the balls by the action of a heavy compression spring. The whole mechanism is enclosed in a cone-shaped casting that forms the grinding chamber. Easy access is provided by a handhole with removable cover, or the entire upper section of the casting may be removed as shown in one of the illustrations.

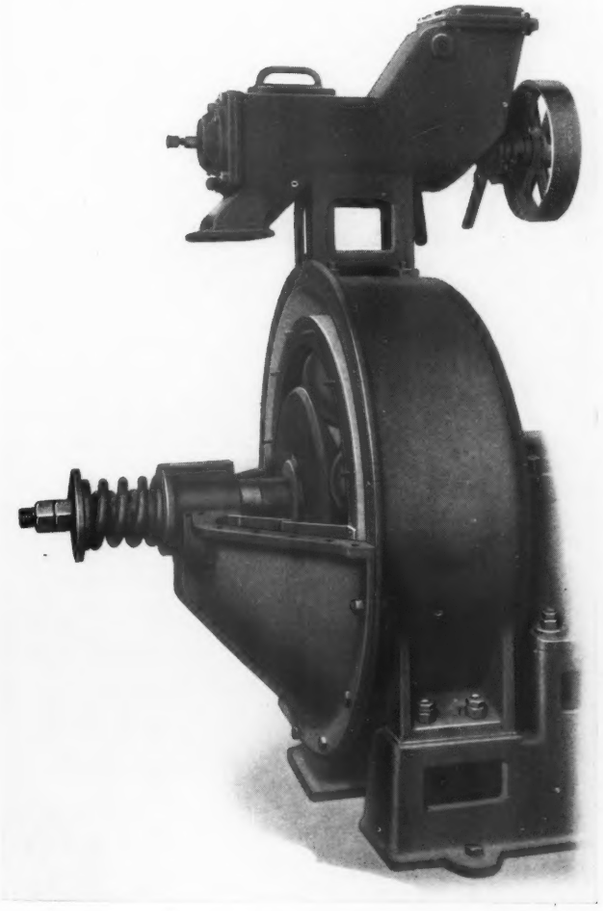
The feed mechanism is mounted above the mill, and it consists of a screw-type feed which is driven from the main shaft by a belt. The rate of feed may be regulated by the gate valve which controls the size of the opening at the bottom of the hopper. In addition, a shut-off slide is provided at the top of the hopper. The removable cover just above the screw gives access to the feeder.

The raw material, as well as tailings from the separator, enter the hopper and are passed along by the screw feeder to the spout which discharges the material into the grinding chamber. It passes from the stationary cone to the revolving cone and is thrown by a plow into the grinding ring. As fast as the product is ground to the required fineness, it is promptly discharged from the mill, preventing an accumulation of fines, and keeping the balls free for grinding on the coarse material. As the product is discharged from the bottom of the mill, it is elevated to the mechanical air separator, where the fines are removed to the finish bin, and the tailings returned to the mill. The operation is a one-stage process, with a constantly circulating load.

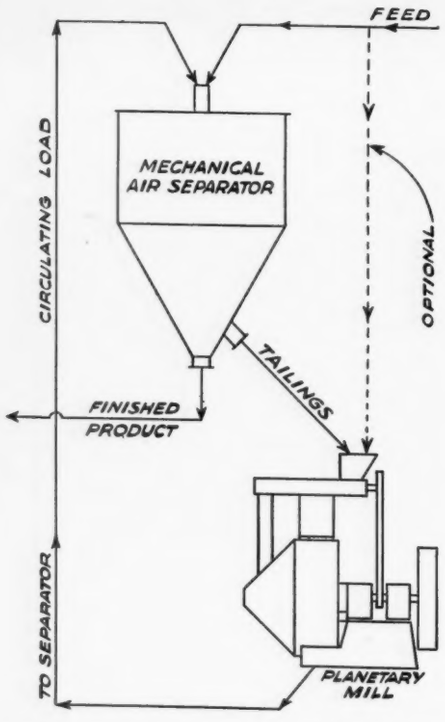
The grinding pressure is maintained by the centrifugal action of the balls as they whirl in the grinding ring, and it is held constant at any given speed of the mill. The simplicity of the operation results in high pulverizing efficiency and low power



Complete assembly of the planetary mill.



Mill with section removed, showing details of grinding elements.



Flow-sheet of planetary mill in closed-circuit arrangement with mechanical air separator. Two directions of feed are shown: (1) Direct to separator for scalping off the fines; (2) Through mill first for pre-grinding then to separator.

consumption. The planetary mill is sturdily built throughout, reducing vibration and wear to a minimum. The main shaft is extra heavy, and is mounted in babbitt bearings with ring oilers. One base carries the mill, drive and feeder complete, greatly simplifying installation.

Further information regarding the details of the planetary mill and its applications, may be had by writing the manufacturer, Raymond Bros. Impact Pulverizer Co., 1315 North Branch St., Chicago.

New Portable Plant Has Unit-Type Construction

Convinced of the need for a portable crushing and screening plant, which would enable producers to work good local deposits in competition with small short-haul pits, Stephens-Adamson Mfg. Co. of Aurora, Ill., has developed a unit-type plant of unique design. The plant consists of a number of standard units designed for quick assembly in different combinations to suit the particular job or deposit in which the operator is interested. These units consist of a receiving hopper and feeder, a crushing unit, a screening unit, storage hoppers, and complete belt-conveyor units. Each unit is self-contained, comparatively light and easy to move, thus simplifying the job of moving and setting up in new locations.

Apparently the plant is designed to handle a wide variety of deposits. The crushing unit is built to take one or two crushers of various makes, types and sizes. Likewise, the screening unit will mount a single-, double- or triple-deck vibrating screen. Where washed material is required, water-sprays are added above the screen and a classifier or dewatering unit can be quickly inserted. Gasoline or Diesel engines or electric-motor drives can be furnished and where electric power is not available for motors, portable generator sets are offered.

Several advantages are claimed for this type of plant. The various units, while quite compact, allow greater headroom and clearance for inspection, lubrication and adjustment than is practicable in single-assembly plants. The operator has a wide variety of combinations to choose from and need not haul any unnecessary equipment to new locations. Another economy claimed by S-A engineers is that the operator can buy only the units actually required for the job on hand. For later jobs, additional units can easily be bought as needed.

Mask Protects Worker from Dangers of Dust

The Cesco Healthguard mask is especially designed for occupations where harmful dust is encountered. With this new mask, positive protection is assured. The mask consists of a rigid metal face piece on which is mounted a pure gum rubber pneumatic cushion which shapes itself to the contour of the face, sealing the interior of the mask against outside air. The mask is held in position by an adjustable elastic harness.

The dust mask.

Air under pressure is forced through a special air filter with which the mask is equipped, and enters the mask through a metal tube so shaped as to release the air at certain advantageous points. The main air supply is released in a chamber at the lower end of the mask, dispensed by passing through a baffled plate, filtered through a sponge and directed past the nose and mouth of the wearer. This air stream assures a constant and steady flow of fresh air for breathing.

Air currents are also released and directed over both lenses, inside and outside, preventing fogging or steaming. An air current is also directed toward a small screened opening in the mask, acting as a suction and exhausting the interior of the mask of all exhaled air. The interior of the mask is always cool and offers absolutely no discomfort to the wearer.

The mask is one of the newer products of the Chicago Eye Shield Co., makers of a wide variety of safety equipment for the pit and quarry worker.

Small Underfeed Stoker of Rugged Construction

Combustion Engineering Corp. has recently placed on the market a new underfeed stoker suitable for application to both heating and industrial boilers in the approximate range of 40 to 150 developed boiler horsepower. This stoker is of exceptionally rugged construction throughout and embodies a number of distinctive features. Its fuel-feeding mechanism is of the ram or plunger type and comprises a main ram or pusher and auxiliary pushers, all mounted on a sliding plate which moves back and forth in the bottom of the retort. The grate surface is composed of stationary bars with moving elements, or *tuyeres*, which serve to agitate the fuel bed and make for more effective air distribution. Standard equipment includes dead plates on either side of the active grate surface, but at the option of the purchaser these may be replaced by easily operated shaking dump grates of sectional type.

The drive is supplied by a constant-speed motor, variation in fuel supply being secured by means of a special timing device which regulates the number of strokes of the plunger per minute in accordance with load requirements. An 8-to-1 speed range is thus secured. The transmission is very rugged and is equipped with roller bearings. The fan is integral with the drive and is equipped with silent inlet dampers.

The control system, included as standard equipment, provides continuous adjustment of fuel feed and air supply over a wide range of load, and automatic on-and-off control during banking periods.

This stoker is identical in principle to the well-known Type E stoker which has been on the market for nearly 30 years, and which is serving over 11,000,000 sq. ft. of boiler heating surface in this country.

Offers Improvements in Elevator-Bucket Design

A new design of elevator bucket for heavy-duty work, said to be the first notable improvement in cast-bucket design over a period of years, is announced by Link-Belt Co., Indianapo-

lis, the last innovation having been the appearance of reinforced lips and reinforced backs.

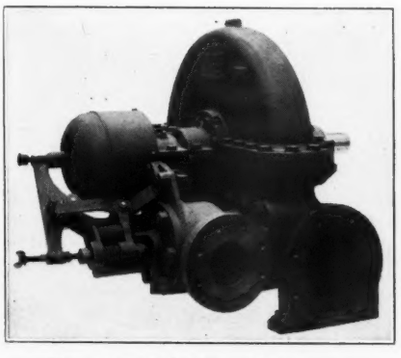
The new bucket, to be known as Style AAP, is made in all popular sizes up to 18 in. by 8 in., and its principal features are summarized as follows: (1) heavy back; (2) heavy lip; (3) reinforced corners; (4) front reinforcing ribs; (5) reinforcing bead around ends; (6) middle of lip raised to reduce digging strains; (7) made of Promal—a stronger, longer-wearing metal.

The company states that the AAP bucket embodies ideas gained from users of buckets in many fields, as well as an improvement in its foundry department in the method of pouring buckets, resulting in sounder castings than was possible with the old method.

It is claimed that the new bucket, while weighing and costing a trifle more, will result in notable economies through its longer life, accruing from a distribution of metal which insures the maximum in wear resistance and endurance, Promal in itself being stronger and more durable than malleable iron. The ribs down the front and the heavy flat bead around the ends offer added resistance to the bucket's being twisted out of shape under severe service, as in the handling of ores, stone, sand and gravel, fertilizer materials, etc.

Small Mechanical-Drive Turbine Has Many Uses

A new mechanical-drive, noncondensing steam turbine for driving centrifugal pumps, fans, and other rotating equipment has been developed by the General Electric Company. This turbine is suitable for driving equipment at speeds from 1,200 to 4,000 r.p.m. and is available up to 250 hp. under suitable steam conditions. The new turbine is a single-stage machine with two rows of revolving buckets. Simple in construction, it is an addition to the standard line of General Electric mechanical-drive turbines. The wheel casing is split horizontally to allow easy access to the internal parts and the steam and exhaust pipes are connected to the lower half of the machine. A centrifugal governor, with weights pivoting on knife edges, operates with very little friction and provides proper speed regulation. An independent emergency governor is included. The new turbine bears the type designation D-59 and, except for being larger, is similar to the type D-57.



The mechanical-drive turbine pump.

The dredging pump with drive pulley.

Dredging Pumps Designed to Meet Specific Needs

Byron Jackson Co. of Berkeley, Cal., have, through years of observation and development, developed a line of highly successful sand, gravel and stone pumps. Rugged construction and consequent reliability have not been sacrificed in obtaining reasonable hydraulic efficiencies.

The materials used in the construction of its sand, gravel and rock pumps are varied to meet the conditions under which the pumps will normally operate. On installations required to operate over extended periods of time, and in particular instances where boulders are being handled, the pumps must of necessity be built with heavier cases and with covers and impellers of stronger materials than are used on pumps handling sand and gravel, or where the period of operation is of comparatively short duration, such as on construction jobs.

Impellers of the two- or three-ported type having large passages which offer no contracted sections, in which solid materials might lodge, have been found to maintain their efficient characteristics throughout long periods of operation. However, as an impeller wears in time, the water passages are gradually enlarged, resulting in an increased capacity. For this reason, and also because of variable conditions usually encountered, it is good practice to provide a reasonable amount of excess horsepower.

Byron Jackson pumps for dredging and kindred service fulfill all requirements, especial attention being given to the various details, such as:

1. Strength to withstand the shocks to which they are subjected under continual pounding of the material discharged by the impellers.

2. Ability to withstand wear occurring between the impeller disks and the suction and shaft side covers.

3. Effective seal between the pressure chamber and the suction entrance to the impeller.

4. Freedom from destructive vibration.

5. Omission of internal bearings in the hydraulic parts of the pump.

6. Accessibility to the suction entrance to the impellers for removing or breaking boulders or objects too large to pass through the pump.

7. Accessibility of all working parts of pump and bearings for inspection or repairs.

8. Ability to maintain the water seal in the stuffing box.

All pumps are made with cases of semi-steel. All the larger pumps may be obtained with standard cases to be used for sand-and-gravel pumping, or with extra heavy cases to be used for rock pumping. Experience has proven that heavy cases made of semi-steel will not only resist shocks incident to the impact of rocks, but are amply hard to resist the abrasions to which they are subjected.

Each pump is provided with a cage ring in the stuffing box to which clean water, under a constant pressure several pounds greater than the pressure at the discharge opening of the pump, should be introduced. This sealing water, if clean, minimizes wear on the shaft, as it tends to exclude any gritty material from entering the stuffing box. Ribs are cast on the back of the impeller, serving to create a pressure outward from the hub of the impeller, thus forcing sand and grit away from the sealing passages by centrifugal action, and further protecting the stuffing box.

If clean sealing water from an outside source is not available under sufficient pressure, it is recommended that a small water pump be used for this purpose. However, it is possible to operate the pump by introducing hydraulic grease to the cage ring under high pressure, but this is a somewhat less satisfactory method of operation, as it does not insure the exclusion of all grit.

The impellers are dynamically balanced before the pumps are assembled, as a precaution against vibration. The ribs on the back of the impeller partially balance the hydraulic thrust. The residual axial thrust is absorbed by heavy duty two-way thrust bearings mounted within the massive bearing housing.

Manitowoc Making New Cement for Highways

The Medusa Portland Cement Co., owns the American rights for a new cement which was invented by a German chemist and considerably reduces the amount of cement required in the construction of permanent highways. Some of this cement produced by the eastern mills of the company was used last summer on highways in Ohio and Pennsylvania.

Special machinery to manufacture this cement was installed at the plant of the Manitowoc Portland Cement Co., a subsidiary of Medusa, at Manitowoc, Wis., some time ago. Recently the laying of some pavement using this cement in Ozaukee County, Wis., was witnessed by highway engineers from a number of mid-western states.

Manchukuo to Construct Extensive Road System

Predicting the new Manchukuo government would soon be in the market for material for 4,000 additional miles of railroad and 10,000 miles of concrete highways, Dr. Inazo Nitobe, member of the House of Peers of Japan, declared in an address before the Japanese Chamber of Commerce that both the material and spiritual interests of the United States and Japan would be furthered by continued existence of the new government.

Oklahoma Legislator to Seek Raid on Road Fund

A bill to divert $8,000,000 from the highway funds to help pay off state indebtedness will be proposed to the Oklahoma legislature by Senator E. M. Reed, according to announcement published recently. He will ask that the entire revenue from license tags, amounting to nearly $5,500,000 yearly, and 2 c. of the 4-c. gasoline tax be used in wiping out state debts instead of building roads and maintaining highways.

"All this gasoline money goes into the highway funds; what we have got to do for two or three years is to stop building roads. It's more important to put the state on a sound financial basis than to keep spending money we haven't got on new highways," Senator Reed said.

Fire Fails to Delay Ohio Gravel-Plant Shipments

Fire, believed to be of incendiary origin, recently caused damage estimated at $2,000 to the plant and equipment of the Eastern Ohio Sand & Supply Co. at East Liverpool, O. The fire was extinguished by the local fire department before it gained great headway and the loss is completely covered by insurance. Temporary bins were used for loading out material to several jobs under contract while repairs were being made to the plant.

Correction

In the story describing the plant of the Alpha Portland Cement Co., at Phoenixville, Ala., published in the Sept. 7 issue of PIT AND QUARRY, the following statement was made on page 15: "All the electrical equipment, with the exception of a few odd motors, was furnished by the General Electric Co." This should have read: "All the electrical equipment, with the exception of the four Compeb mill motors and a few odd small motors, was furnished by the General Electric Co." Also, in the tabular analysis on page 16 credit for these four motors should have been given to the Allis-Chalmers Mfg. Co.

Incorporations

OAK HILL SAND & CEMENT PRODUCTS CO., LTD., 219 Central Bldg., Victoria, B. C., Canada. Capital $25,000.

MERCER SAND & GRAVEL CO., Trenton, N. J. 100 shares n.p.v. Stephen H. Barlow, president; William A. Moore, vice-president; J. S. Berstein, treasurer.

MANKATO CRUSHED STONE CO., St. Paul, Minn. Fred B. Desch, A. A. McGree and Guy Chase.

MORGAN COUNTY MINERALS CO., Knoxville, Tenn. H. M. Wimberly, Mercantile Bldg.

WATERWAYS STONE CO., Princeton, Ky. Capital $10,000. W. C. Sparks, A. B. Rodes and H. E. Rodes.

STERLING CRUSHED STONE CO., INC., Boston, Mass. Capital $50,000. Octavius Menici, 19 Martinack St., Peabody, Mass., president, treasurer.

National Slag Assn. Moves to New Office

The National Slag Assn. on Oct. 10 removed its offices to Room 1449 Leader Bldg., Cleveland, O., according to an announcement recently made by H. J. Love, manager.

Statement of Ownership

PIT AND QUARRY

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of PIT AND QUARRY, published bi-weekly at 538 S. Clark Street, Chicago, Ill., for October 1, 1932.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared H. W. Baumgartner, who, having been duly sworn according to law, deposes and says that he is the business manager of PIT AND QUARRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Complete Service Publishing Co.; Editor, S. A. Phillips; Business Manager, H. W. Baumgartner, all of Chicago, Ill.

2. That the owner is Complete Service Publishing Co., Chicago, Ill. That the stockholders owning 1% or more of the total amount of stock are: H. W. Baumgartner and I. A. Baumgartner, both of Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

H. W. BAUMGARTNER,
Business Manager.

Sworn to and subscribed before me this 22nd day of September, 1932.

(Seal.) M. J. STANTON,
Notary Public.

My commission expires Dec. 9, 1934.

Saving Through Safety

Eye Accidents Head Permanent Injuries

By J. B. ZOOK
Safety Director
Great Lakes Portland Cement Corp.

ACCORDING to statistics published by the Compensation Board of the State of New York, on the basis of frequency of injury, the hands and fingers occupy first place. On the basis of severity of permanent injuries, eye accidents are most important. Over a 5-yr. period the average compensation per case for all eye cases was $678, as compared to an average of $320 for all other cases. In 1930 $1,792,527 was paid in compensation in New York State for eye injuries in industry. Of this amount $1,623,876 was paid for permanent partial eye disabilities, the average compensation paid per case being $1893.00.

Undoubtedly this experience is worthy of some very earnest consideration, inasmuch as eye injuries are among the most serious industrial accidents both in their cost to the employer and in handicapping the employee in his ability to earn a living.

You certainly would not blindfold a man and expect him to make a high safety record. Seeing well is 99 per cent. of accident prevention. Therefore, it is essential that we devote our best efforts and thought toward providing eye protection which will maintain as clear vision as without goggles, that will afford the proper physical protection against flying bodies, or shut out light which would permanently injure the delicate membranes of the eye. To perform this job properly we must consider, first, the man who is to be fitted with eye protection; second, his job and the eye hazards incident to it, and, third, the proper protection to overcome the hazard.

It is not sufficient to give the employee a pair of goggles and tell him to wear them. It is absolutely unreasonable to believe that all faces are so nearly alike that one arbitrary standard goggle will fit any and every one.

* Presented at Joint Session of Cement and Quarry Sections, National Safety Congress, Oct. 6, 1932.

Each pair of goggles must fit the face on which they are to be worn so that they are comfortable, are easy to adjust, fit tight enough, and do not allow dust to enter between the face and the frame. The matter of comfort is most important. If the frames hurt the wearer's face, if he is subjected to discomfort of the eyes, has headaches, is nauseated or suffers any ill effects while wearing goggles that he had not experienced before, then there is something wrong with the goggle, not the man.

There are various types of goggles and enough different shapes so that with a little study the safety man may be able to provide goggles that are comfortable and not unpleasant. The man who wears the goggles is the man to be satisfied, and if he is satisfied, he will wear his goggles.

Assuming that our man has good vision without the aid of prescription glasses, improper goggles may cause extreme discomfort to him, causing headache, nausea and impaired vision. Suppose, for illustration, you should try to wear some one else's prescription glasses, you would experience these same sensations. The explanation is this: if the goggle lenses are made of a glass which has refractory characteristics, that is, if the rays of light passing through the glass are bent from their original direction of travel to enter the lens of the eye distorted, a distorted image is transmitted to the retina and the optic nerve. This is abhorrent to our brain and an immediate effort is made to correct the focus of the eye and the muscles of the lens are then subjected to an unnatural strain upon them to maintain this correction.

A very simple, though severe test may be made upon all lenses as follows: Mark a white card with two black lines crossed at right angles to each other and fasten this card to the wall. Set up an ordinary surveyor's level and adjust the cross hairs to coincide with those on the card, properly focusing the instrument to do this. Now hold the lens in front of the telescope and look at the crossed lines on the card through it. If the cross hairs of the telescope do not coincide with those on the card as before, if the lines on the card are blurred, or if, as the lens is slightly moved up and down or sideways, the lines on the card move also, then the lens has refractory qualities that may cause eye strain if used in goggles. Perfect glass will not change the image of the lines on the card. It must be understood that this test is very severe and slight refractory qualities in the glass will be very much magnified and should not absolutely condemn the goggle under test.

According to a Review of Eye Accidents to employees among plants reporting to the Portland Cement Assn. in the year 1930, 42 cases resulted in 536 days of lost time, the average loss of time being 12.7 days. These 42 cases were divided among departments as follows:

Department	Accidents	Days Lost Time	Severity (per cent. of 624 days)
Quarry	6	124	19.8
Crushing	1	2	.3
Coal grinding	2	19	3.0
Raw-grinding department	2	25	4.0
Burning	7	177	28.3
Finishing	7	36	5.8
Cement storage	2	30	4.9
Packing and shipping	4	22	3.6
Power	1	24	3.8
Shops	6	71	11.4
Yard	3	82	13.2
Others	1	12	1.9

It will be seen from these figures that the burning, yard and shop departments in the order named contributed the greatest severity.

Goggles worn for repair work, chipping, pouring babbitt metal, etc., need not be dust-tight. They should have protective screens around the lenses, however, to ward off flying bodies. The lenses must be of the non-shatterable type. It is impossible to name rules for every case where goggles are to be worn, the only safe way is to wear them all the time, then there is the least possibility of danger to the eyes.

When Portland cement comes in contact with the sensitive cornea of the eye the pain is extreme and may result in permanent injury to the sight. The cornea is burned, and, since there are no blood vessels in it, it is slow to heal, leaving a scar which may often be serious enough to cause partial permanent loss of sight. The thorough correction for this would be to have all men working in packing departments wear goggles, but at least the men operating the packing machines and trucking from them should have eye protection. Glass shields of non-shatterable glass have been installed on packing machines and seem to be more satisfactory than goggles, in that the shields are easier to keep clean and also protect the face from hot cement from bursting bags or open spouts.

The naked eye should never be exposed to the electric arc, and welders should always be provided with helmets equipped with the proper filter glass which will prevent the infra-red and ultra-violet rays from reaching the eyes. Acetylene welders should wear suitable goggles also to shut out these injurious rays. The proper shade of glass should be used in these goggles and helmets to prevent eye strain which may be caused by trying

to see through a glass which is too dark, or by the eye trying to keep out the excessive light passing through the glass. For example, quickly remove the goggles from a man engaged in welding or burning operation and look at the pupils of his eyes. If the pupils are distended and very large the iris is trying to allow more light to reach the retina and the eye is strained trying to see an object through glass which does not allow enough useful light to penetrate it. If the pupils of the man's eyes are very small, sometimes mere pin points, then the opposite is true. The iris is trying to shut out the light that is unnecessary to enable him to distinguish the object in front of it. In this case a darker shade of glass should be used, so there is no change in the size of the iris from normal conditions to those of welding operations.

In the performance of clinker burning in the manufacture of Portland cement it is necessary for the operators continually to inspect the conditions existing in the kilns at the point where the actual fusion of the ingredients takes place. The temperatures in this zone are as high as 2,700 deg. F. and it is physically impossible to look into this blinding light without eye protection.

It has been a subject for much discussion as to whether the blue glass generally used for this purpose really protects the eyes, particularly against the harmful infra-red and ultra-violet rays present in light intensities resulting from these high temperatures. Tests have been made upon this type of glass and have brought out the following facts:

1. That cobalt blue glass does not filter out infra-red rays.

2. That depth of color in protective glass affects the visible rays only.

3. That infra-red and ultra-violet rays which cause eye fatigue and eventually cause permanent impairment of vision, can be eliminated only by the introduction into the glass of certain elements.

The use of cobalt blue glass for kiln burners is undoubtedly due to the set ideas of these men that that is the only kind of glass that they can use to see the conditions as they are in the kiln, and they abhor the idea of changing to anything new. These men must be brought to see the dangers of improper eye protection and they must be convinced to their own satisfaction that they can see better with the proper type of glass. There are several companies who manufacture special glass for this purpose and these glasses afford more vision than the ordinary blue glass. True color transmission is also obtained. Muscular focus is easier because of the elimination of the injurious rays, from which the eye no longer has to protect itself. The use of a hand shield equipped with a No. 6 shade of welding glass filters out all the ultra-violet rays, 99.99 per cent. of the infra-red, and admits enough visible rays to enable the wearer to determine perfectly the burning conditions in the kiln. The shield for the entire face and neck is preferable to goggles or glasses in that it also protects the operator from dust and heat puffed back through the peep hole in the hood. This is important.

A program of eye protection should be worked out by means of careful study of the hazards involved, and a definite plan of procedure followed. After making a complete survey of working conditions, rules covering the use of eye protection should be made, especially in the department affording the greatest hazards both as to frequency and severity. The use of such rules is very valuable in that it definitely affords the men knowledge of what is expected of them in an understandable manner. There is no sound reason for any man objecting to the wearing of goggles unless he has defective vision. Goggles of the right kind will not affect vision in any way.

One more very important point I wish to mention is this: Send every eye case to an eye doctor, no matter how trivial. Efforts of other employees to assist in these cases can cause an otherwise trivial case to become infected, and infection following minor eye injury is the cause of many eye injuries becoming serious. Immediate first-aid treatment, administered by a registered nurse, in which the eye is washed out may oftentimes be all that is needed, but in every case where the foreign body is lodged in the cornea the victim should be sent at once to the doctor.

Alpha Recalls Workers to Phoenixville Plant

The Alpha Cement Co. resumed operations at its Phoenixville, Ala., plant on Sept. 19 and called 75 employees back to work.

Cement companies expect to be running full blast throughout the Birmingham district within 60 days, according to reports from officials in that area.

Governor Congratulates Superintendent

Hon. Charles W. Bryan, governor of Nebraska, congratulates A. K. Frolich, superintendent of the Louisville, Neb., plant of the Ash Grove Lime & Portland Cement Co., on the winning of the Portland Cement Assn. safety trophy, shown in the background. Gov. Bryan spoke at the dedicatory ceremonies held at the plant on September 24.

Eighteen tons per hour from a No. 19 Crusher–100% through three-eighth inch opening using less than fifteen horsepower

THE following is the result of a test on a No. 19 Kennedy Ball Bearing Gearless Crusher.

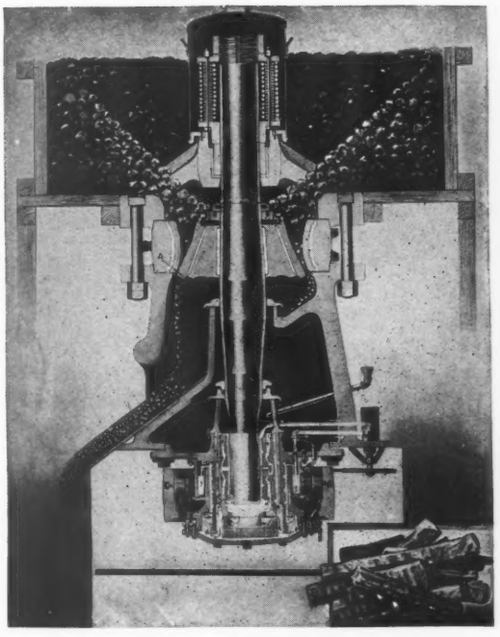
Exceedingly hard glacial gravel, 1½" and plus ⅜", was crushed for sand for concrete purposes, and less than fifteen horsepower was used.

The same crusher can be opened up and 1½" stone can be produced at a rate of from 30 to 50 tons per hour.

With the opening set to ⅛" on the closed side the following results were obtained:

Minus ⅜"	100 %
Plus 3 mesh	21½%
Minus 3—Plus 4	17 %
Minus 4—Plus 14	36½%
Minus 14—Plus 48	15 %
Minus 48—Plus 100	4 %
Minus 100	5½%

This was crushed at the rate of 18 tons per hour.



Built in various sizes with receiving openings from 1¾" to 14". Produces sizes from ⅛" to 3", with capacities up to 620 tons per hour on the larger sizes.

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We manufacture a complete line of primary jaw and gyratory crushers, ball mills, rod mills, screening, elevating, and conveying equipment, etc. Complete information describing any or all of this machinery will be sent on request. *Send for latest information on our vibrating screen.*

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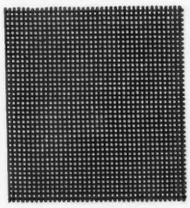

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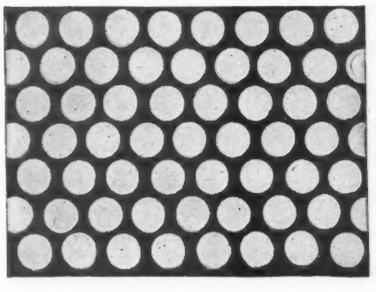

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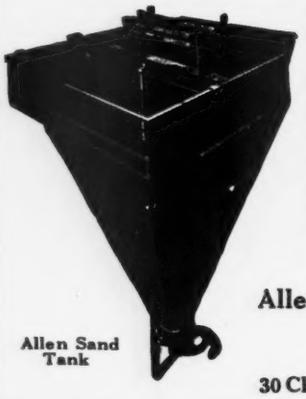
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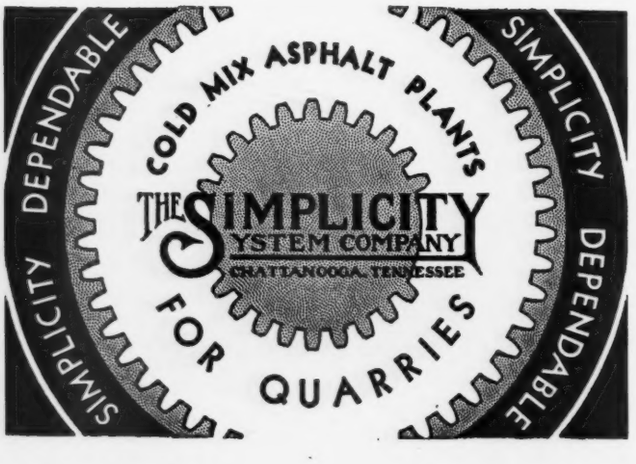

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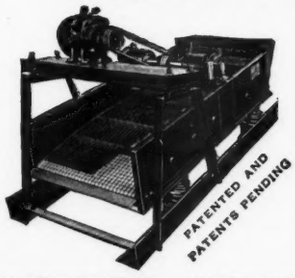

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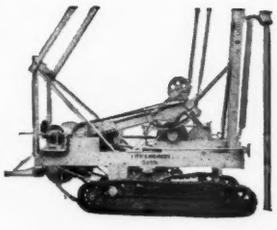

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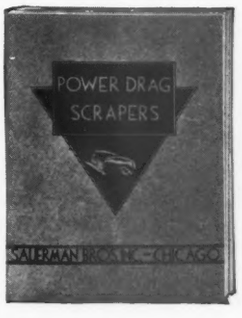

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1-275	G. E.	550	Synch.	900
2-200	G. E.	2200/440	Synch.	514
1-200	Wsthse.	440	Slip Ring	500
1-200	F. M.	440	Slip Ring	600
1-200	Wsthse.	220/440	Sq. Cage	585
1-150	G. E.	550	Synch.	720
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Frequently you will find items in Pit and Quarry that are of real value—items that you will want to refer to later.

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PIT AND QUARRY

Research Department

538 South Clark St., Chicago, Ill.

Please send me catalogs and prices concerning the following items checked below:

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☐Agitators, Slurry
☐Air cleaners
☐Air compressors
☐Bag filling and weighing machinery
☐Bags, cloth
☐Bags, paper
☐Balls, steel
☐Barges, steel
☐Belt dressing
☐Belt fasteners
☐Belting, conveyor and elevator
☐Belting, transmission
☐Belt lacing
☐Belt plates
☐Belt rivets
☐Belt tighteners
☐Bin gates
☐Bins, concrete
☐Bins, steel
☐Blasting supplies
☐Blasting powder
☐Blocks, friction
☐Boats, self-unloading
☐Bodies, Motor Trucks
☐Brake Linings
☐Buckets, Clamshell
☐Buckets, Conveyor and Elevator
☐Buckets, Dragline
☐Buckets, Orange Peel
☐Cableways, Slackline
☐Calcining Machinery
☐Car Dumpers
☐Car Pullers and Movers
☐Carriers, Belt
☐Cars, Dump
☐Cars, Kiln
☐Castings, Manganese Steel
☐Castings, Steel
☐Chains, Conveyor and Elevator
☐Chains, Power Shovel, Crane and Dredge
☐Chains, Transmission
☐Chutes
☐Classifiers
☐Clips, Wire Rope
☐Clutches
☐Clutches, Magnetic
☐Concrete Plants, Ready Mixed
☐Cones, Washing
☐Conveyors, Apron
☐Conveyors, Belt
☐Conveyors, Pneumatic
☐Conveyors, Screw
☐Conveyors, Skip
☐Coolers
☐Couplings, Flexible
☐Couplings, Hose
☐Cranes, Locomotive
☐Cranes, Overhead Traveling
☐Cranes, Truck
☐Crushers, Cone
☐Crushers, Disc
☐Crushers, Gyratory
☐Crushers, Hammer
☐Crushers, Jaw
☐Crushers, Ring
☐Crushers, Roll
☐Crushers, Rotary
☐Cutter Heads, Dredging
☐Derricks
☐Draglines, Cableway
☐Draglines, Revolving Boom
☐Dredges, Dipper
☐Dredges, Hydraulic
☐Dredges, Ladder
☐Drill Sharpening Machinery
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☐Dryers, Rotary
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☐Dynamite
☐Elevators, Bucket
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☐Engines, Gas
☐Engines, Gasoline
☐Engines, Hoisting
☐Engines, Oil
☐Feeders
☐Filters, Air
☐Filters, Oil
☐Fire Brick
☐Flanges, Pipe
☐Frogs and Switches
☐Fuses, Blasting
☐Gears
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☐Governors
☐Grinding Balls
☐Grizzlies
☐Guns, Hydraulic
☐Hoists, Air
☐Hoists, Derrick
☐Hoists, Drum
☐Hoists, Motor Truck Body
☐Hoists, Skip
☐Hose, Air Steam, Water
☐Hose, Sand Suction
☐Hydrators
☐Kettles, Calcining
☐Kilns, Rotary
☐Kilns, Vertical
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☐Loaders, Portable
☐Loaders and Unloaders, Box Car
☐Locomotives, Diesel
☐Locomotives, Gasoline
☐Locomotives, Steam
☐Log Washers
☐Measuring Devices
☐Mills, Compartment
☐Mills, Tube
☐Mixers, Plaster
☐Motors, Electric
☐Motors, Gasoline
☐Motor Trucks, Ready Mixed Concrete
☐Nozzles, Hydraulic Mining
☐Nozzles, Gravel Washing
☐Nozzles, Spray
☐Nozzles, Dust Settling
☐Nozzles, Suction Hose
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☐Pulverizers, Roll
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☐Pumps, Deep Well
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☐Sand-Lime-Brick Machinery
☐Scales, Track
☐Scales, Truck
☐Scrapers, Dragline
☐Screens, Revolving
☐Screens, Shaking
☐Screens, Vibrating
☐Separators, Air
☐Separators, Dry Centrifugal
☐Separators, Magnetic
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☐Shovels, Steam
☐Skips
☐Sleeves, Dredge
☐Slugs and Nuggets, Grinding
☐Speed Reducers and Gears
☐Spray Nozzles
☐Sprays, Paint
☐Sprockets
☐Steel, Tool
☐Stokers
☐Switches, Track
☐Tanks, Concrete and Steel
☐Tanks, Sand Settling
☐Tanks, Wood
☐Thickeners, Slurry
☐Track, Portable
☐Track Shifters
☐Tractors, Crawler
☐Tramways, Aerial
☐Trippers, Belt
☐Trippers, Tramway
☐Unloaders
☐Valves, Pump
☐Washers and Scrubbers, Sand, Gravel, Stone
☐Weighters, Automatic
☐Welding Supplies
☐Wheels, Car
☐Winches
☐Wire Cloth
☐Wire Cloth, Manganese Steel

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Firm Name..... *Individual*.....

Address..... *City*..... *State*.....

The PIT AND QUARRY Employment Service for subscribers has registered the following applicants for positions. Perhaps you have an opening in your organization for one of these men. If so, PIT AND QUARRY will be pleased to put you in touch with the applicant if you will advise us which one fills your requirements.

1-A. 12 years' experience Highway construction and sand and gravel. Can design and install own pits. Ready-Mix concrete. Have operated Central Mixing plants.

4. Stone Quarry Supt. or Supt. asst. 12 yrs. experience in commercial stone and railroad ballasting; operating and repairing all kinds and makes of equipment. Wide experience in drilling and blasting. A-1 references.

5. Chief engineer cement plant; 10 years' experience; desires connection with engineering or manufacturing firm, either in the office or in the field.

9. Quarry foreman, 6 years' experience.

10. Superintendent; 10 years' experience; lime and stone.

11. Superintendent crushed stone; 25 years' experience.

12. 10 years' experience in production of crushed gravel and sand; design engineer and builder; general superintendent; has had some sales experience. Experience covers the entire field.

14. Thoroughly experienced superintendent who has also in the past been assistant superintendent and foreman of granite and lime quarries; at present not employed.

15. General Manager or Superintendent with 8 years' experience in hydraulic sluicing operations applied to stripping and mining of sand and gravel and large excavation and fill work. This is the cheapest and most powerful excavation and transportation agent known where plentiful water supply and height of deposit and gravity are available. If you have such a deposit or problem with the necessary natural features, your costs under other methods can be tremendously reduced. Capable executive, technical graduate, long experience, age 42, married. Especially valuable to organization contemplating recovery of sand, gravel and gold from placer deposits. References.

16. Superintendent, 30 yrs. experience, mine, mill and quarry and large shovel operations, thorough knowledge of various systems of underground and open pit mining. Development work from grass roots to mill construction and operation, copper, iron, zinc and non-metallics, 4 yrs. special work in asbestos, mica and kaolin, good organizer and good production and safety record but not a college graduate. South, Southwest or Tropics preferred.

18. Superintendent of stone crushing and sand and gravel plant with considerable experience in operation of dredges, draglines, electric and steam shovels, all kinds of crushing, conveying, screening equipment. Can furnish excellent references, good record and details of past experience.

19. Electric Shovel Operator with considerable experience. Also power-house and general electrician, maintenance, welding, repairing gasoline truck motors, crushers, screens and various kinds of equipment.

20. Crushed stone superintendent since 1903; prefer West or Southwest territory; thoroughly experienced in construction and operation of plants, know how to get best results from the quarry end.

21. Cement plant superintendent or heavy limestone quarry; 20 years' experience in construction and operating plants.

24. Superintendent, stone quarry or slag plant 16 years office and operating experience.

25. Dragline, Crane and Shovel Operator, 9 years' experience in steam and 3 years on electric shovel (Marion), desires position as operator. Can do own repairing. Permanent connection desired. Married. References furnished. Will go anywhere, but a location near good schools preferred.

26. Operator with 5 years' experience on Link-Belt and Koehring cranes. Also 7 years' experience in sand and gravel pit. Available now. Go anywhere.

27. Laboratory work, 3 years' experience as Asst. Chemist doing control and analytical work. College graduate, B. S. degree.

28. 12 years' experience as cement burner and night foreman and watchman.

29. 14 years' practical quarry experience, office, sales, management, superintendent, reconstruction, etc. Open for new connection with progressive company, preferably sand and gravel concern.

30. Crushing plant and quarry Superintendent. Experience includes erecting, rebuilding and repairing machinery. Successful in organizing labor for economy. References furnished.

31. Superintendent crushing plant. 10 yrs. limestone and rock asphalt quarry operation experience. Can furnish best of references. Will go anywhere.

32. An overhead traveling bridge crane man. Experienced. Can give good references. Willing to go anywhere.

33. Cement mill general foreman, 12 years' experience, familiar with all requirements in construction and operation. Available immediately. Can locate anywhere. Single.

34. Capable man. 53 years old. Married, experienced in quarry and crushing plant, timekeeping, payroll and plant office work, seeks position as assistant superintendent, general foreman or plant office work, where experience and loyalty will be appreciated. Will not be interested in investing money at the present time in any position. Have you an opening?

35. Superintendent of crushing and quarrying plant. 14 yrs.' experience in cement business, including changing plants from dry to wet process. Can furnish references.

36. Cement Mill Chemist with 4 years of cement mill work on both wet and dry processes, and 8 years of wide experience in organic analytical work covering all problems incidental to the manufacture of cement.

37. Office man experienced in general office work, correspondence, sales and operations, desires similar position with large lime, cement or gypsum concern. Nine years with Southern lime firm. Age 27, single. Willing to locate anywhere. Available immediately.

38. Situation wanted as Manager or Superintendent of a progressive crushed stone plant where ability and experience would be appreciated. 38 yrs. of age. Scotch birth. American citizen. 15 yrs. experience in quarrying and crushing plants. Now available. Best of references. Location in eastern or middle states preferred.

39. Ten years experience as Burner man; reliable. Age 37. Desires position where ability and skill will be appreciated by advancement. Available immediately.

40. Man with 10 years practical experience in civil engineering and highway construction of all kinds as well as bridges, grading, culverts, etc. Understands map making and topographical survey. Included with this is 4 years tracing and drawing. 3 years with army engineers in Panama. Salary no object.

42. General superintendent or manager; experienced graduate engineer.

43. Sales Engineer desires making change, preferably New England territory. 20 yrs. experience with a reputable concern designing, estimating and selling material handling equipment in all phases. Broad acquaintance among executives and buyers.

44. Want position as carpenter or millwright, capable of taking charge of gang. Steady work preferred with cement company.

45. Operator with ten years' experience on Bucyrus-Erie Steam and P. and H. Gas Shovels in grading, gravel pit and stone quarry work. Can furnish references.

46. Gravel plant supt. or manager. 10 yrs. supt. of large railroad and trucking plants. Experienced in erection and care of gravel plant equipment. Can furnish best of references. Services available at once. Will go anywhere.

47. Graduate Engineer. 25 yrs'. experience as designing, constructing and operating Engineer, as well as Supt. of stone crushing and gravel washing plants, also heavy rock blasting.

48. Graduate Engineer. Wide experience as mining, consulting and sales Engineer, in charge of all outside operations, construction and maintenance. A-1 references.

49. 15 yrs'. experience in erecting and operation, crushing, grinding, washing, drying, screening and separation plants. Know value of low production costs. Good references.

50. Gravel Plant Supt. 7 yrs'. experience erecting and operating gravel plant equipment for large manufacturer. 2 yrs. in charge of mining operations in Brazil. Best of references.

51. Supt. of crushed stone and gravel plants. 12 yrs. experience. Familiar with maintenance and repair work on all types of equipment. Can handle men. First class references.

52. Past experience with Crushed Stone and Sand and Gravel plants; in sales, can figure with contractors, scales, cost, timekeeping, bookkeeping, general all-around man.

53. Quarry superintendent with years of experience in all operations, such as stripping, drilling, blasting, shovel loading, crushing, sinking, also repairing of all quarry equipment and familiar with all phases of washing crushed stone. Now open for proposition. Excellent reference.

54. Engineer experienced in Mechanical, Structural, Electrical, Plant Design and Layout, Estimating, Field work, Maintenance and Millwork desires position. Will locate anywhere.

55. Superintendent of crushed stone products plant and quarry. Twenty years' experience in this and foreign countries in charge of operations. Familiar with modern up-to-date methods and profitable application of same.

56. Master Mechanic, thoroughly trained in the upkeep of crushers, steam shovels, gas and diesel equipment, etc. Reference and complete information on request.

Can You Use THESE MEN ?

Employment Dept.
PIT AND QUARRY
538 So. Clark St. Chicago, Ill.

57. General operating Superintendent desires position with progressive Lime or Cement Company. 20 years' experience as operating superintendent and master mechanic. Familiar with Limestone quarries and burning of limestone and Portland Cement with natural gas or Producer gas. Master Mechanic of large Lime and Cement plants. Installed reasonable system which did not bar progress of operation. References A-1.

58. Position as Superintendent by graduate Mining Engineer. 35 years old with wide operating experience in large open pit mines and crushed stone plants up to 10,000 tons. Thoroughly experienced in Quarry layout, development, heavy blasting, shovel loading, transportation and mill design and operation, electric or steam power, and with latest type high speed reduction crushers, screen analysis of a sampling and grading of specification stone.

59. 13 years' experience in general office work, including correspondence, sales and operations. Well acquainted with freight rate structures on crushed stone, sand and gravel and cement. Desire connection with any concern where ability and experience would be appreciated.

60. Slackline Cableway operator. 5 years' experience. Can keep cableway operating at full capacity. Can do repair work. Had experience raising and lowering mast or tower. Can do all necessary rigging around cableway.

61. Wants position as foreman of a rock, sand and gravel, or oil-mix plant, preferably the latter. Several years' experience as foreman of oil-mix and hot stuff proportioning plant. Can furnish best of references from previous employers and contracting engineers. Will go anywhere but prefer the west or middle west.

62. Position wanted as quarry superintendent. Prefer southwest or west coast.

63. Stone Quarry Supt. or Supt. asst. 14 yrs. experience in commercial stone and railroad ballasting; operating and repairing all kinds and makes of equipment. Wide experience in drilling and blasting. A-1 references.

64. Position wanted by operator with 15 years' experience on cranes, shovels, draglines, sand pumps, dredges, etc. 35 years of age, can furnish A-1 references. Will go anywhere.

65. Graduate mechanical and structural engineer with wide experience on cement and stone plants. Permanent or temporary employment.

66. Superintendent or Foreman of Quarry and Crushing plant or Sand and Gravel plant. 30 years' experience. Can make good anywhere. A-1 references. Available now and will locate anywhere at moderate salary.

67. Successful manager of stone crushing plants, also sand and gravel pits, desires position where previous experience will prove of mutual benefit. Can also sell sand, gravel and stone products or machinery and electrical equipment.

68. Superintendent and Foreman with wide experience in operation of slag, sand and gravel and stone plants. Also experience in railroad work, road construction, grading, ditching, bridges, concrete work, all kinds of excavation, government inspection. Can operate gas and electric cranes. Best of references.

69. Engineer and draftsman, fifteen years' experience, machinery design; structural; plant layout, development, thoroly acquainted with architectural and mechanical design. Technical graduate, also business management and administration course, Alexander Hamilton Institute. Field and office experience. Age 37 years. References.

70. Office man, 10 years' experience in general office work, payrolls, costs, and operations. 9 years with Gypsum Co. Age 30, married, and A-1 references. Will locate in Eastern and Middle States. Prefer lime, cement, and gypsum concerns. Available immediately.

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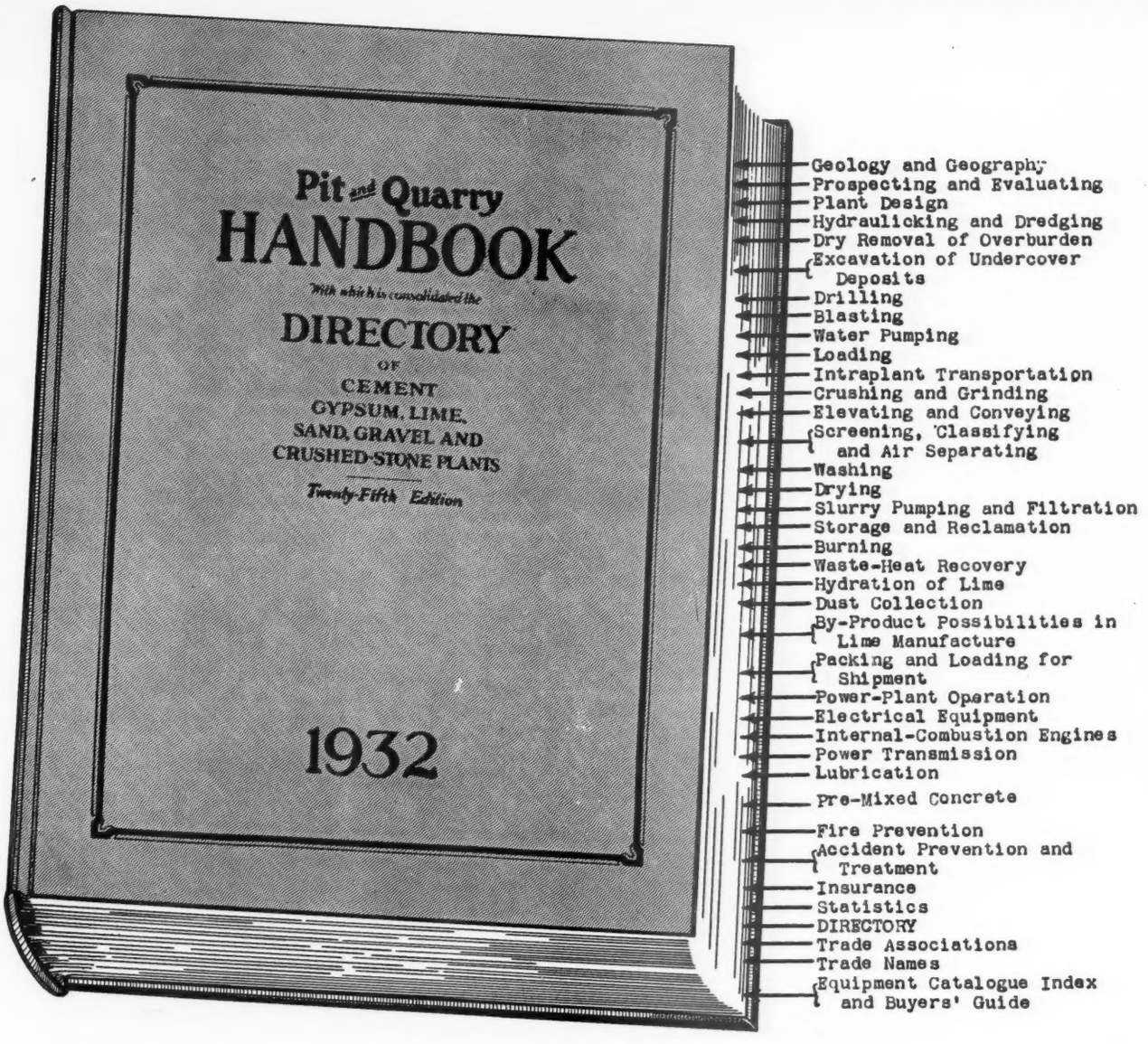
***See also information in the 1932 Pit and Quarry HANDBOOK**



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